To: The Federal Trade Commission
Office of the Secretary
Room H-113 (Annex O)
600 Pennsylvania Avenue N.W.
Washington, D.C. 20580

Via e-mail: https://ftcpublic.commentworks.com/ftc/jewelryguidesroundtable

Dated: June 5, 2013

Re: Jewelry Guides Roundtable, 16 CFR Part 23, Project No. G711001

I. Introduction

The following constitutes the comments of the undersigned trade associations and entities ("Signatories"). These comments are submitted in response to the Federal Register Notice issued by the Federal Trade Commission ("Commission") and published in the Federal Register on May 6, 2013,[1] regarding its review of the Commission's *Guides for the Jewelry, Precious Metals, and Pewter Industries* ("Guides.") This submission addresses the upcoming roundtable discussion and the additional questions posed regarding metals.

The Signatories joining in this submission include manufacturers, wholesalers, distributors, precious metal suppliers and refiners, diamond dealers, colored gemstone dealers, and retailers – the entire jewelry community. In support of this submission, additional consumer perception research and metallurgic testing was performed as explained in the attached appendices, and referenced below.[2] The Signatories' prior submission to the Commission and its attached exhibits are incorporated by reference as if fully included herein.[3]

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[1] Fed. Reg. Vol. 78, No. 87, Monday, May 6, 2013 at 26289.

[2] Additional consumer research was conducted using Google's Insights tool, an online consumer research method. The results from this testing are attached as Exhibits 1 and 2, and a white paper from Google about their methodology is attached as Exhibit 3.

[3] Jewelers Vigilance Committee (JVC), Comment 560895–00027, *available at* http://www.ftc.gov/os/comments/jewelryguidesreview/index.shtm, September 27, 2012 (hereinafter "Association Response").

II. Signatories' Responses to the Commission's Questions

1. JVC recommended a revision to the Guides that would allow sellers to indicate in descriptive marketing materials (e.g., advertisements, labels, tags) that a product contains a precious metal in an amount below the standard, as long as they accurately disclose the quantity of the metal by percentage. It also stated that sellers should not be allowed to stamp the name of the below-standard precious metal on the product itself with a quality mark. Does JVC's proposal provide adequate guidance for marketers to avoid consumer deception?

(a) If so, why? If not, why not?

(b) Provide any evidence supporting your position.

The Signatories maintain our position that the Guides should be amended to allow sellers to indicate in descriptive marketing materials (or on commercial documents) that a product contains a precious metal in an amount below the standard, so long as they accurately disclose the amount of precious metal by percentage.[4] Allowing sellers to inform consumers about the content of jewelry with below-standard levels of precious metals ensures that they are communicating accurate and non-deceptive information regarding the content of their jewelry. Consumers have indicated that it is very important to know the amounts of metals in precious/non-precious metal alloy jewelry.[5] Because consumers value this information, we believe that allowing sellers to describe accurately the content of their products balances the aims of the Guides (preventing consumer deception) with the goals of jewelry sellers (providing information about desirable product attributes to consumers.)

2. Would stamping a quality mark on an alloy jewelry product to convey information about its precious metal content be more likely to lead to consumer deception than if such information were included in descriptive marketing materials such as advertisements, labels, and tags?

(a) If so, why? If not, why not?

(b) Provide any evidence supporting your position.

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[4] Nothing in this suggested revision would restrict a marketer from additionally disclosing along with the percentage of precious metal in the alloy a disclosure of all of the other metals used, if they choose to do so.

[5] 82% of consumers feel knowing the amounts of metals in precious/non-precious mixed metal alloy jewelry is extremely or very important. Harris Interactive Report, p. 31, Exh. 2, Association Response.

The Signatories recommend that quality stamps on jewelry continue to be allowed only for jewelry in which the precious metal content reaches the minimum standards as outlined in the current Guides. Eight out of ten consumers believe that a quality stamp on jewelry indicates that it is made from precious metal.[6] The minimum standards protect these consumers, who have long-standing expectations regarding the content and durability of precious metals.[7] Allowing any quality stamp on below-threshold precious metal alloy jewelry products could mislead consumers into assuming the jewelry contains more precious metal than it actually does, and create misperceptions as to the product's durability.

3. Is it sufficient to disclose the precious metal content of an alloy by percentage, or are other disclosures or qualifications necessary to avoid consumer deception?

(a) Why or why not?

(b) Provide any evidence supporting your position.

In the case of precious metal alloys that meet minimum standards as set forth in the Guides, traditional methods of describing precious metal content (e.g., 14K gold, 925PT) should continue to be employed. We do, however, advocate using percentage to describe alloys with below-standard amounts of precious metal (e.g. 20% gold, 10% platinum). Listing the precious metals in a precious metal alloy by percentage is a clear and accurate way to disclose metal content for products made of alloys that contain less than minimum standards for precious metal content.

Because precious metals are traditionally indicated in different formats (such as karats for gold, .925 for silver and parts-per-thousand for platinum), there is currently no uniform standard of describing metal content across all of the precious metals. In the last revision of the Guides, the Commission stated that percentage was the preferred way to describe metal content in certain platinum alloys.[8] Moreover, research

[6] Harris Interactive Report, p. 7, Association Response.
[7] Almost eight in ten respondents expected an engagement ring described as "platinum" to contain 50% or more platinum. Nearly three-fifths believe it is not at all accurate to refer to a ring with less than 50% pure platinum as "platinum." Harris Interactive Report, p. 35. Respondents also agreed that if they were purchasing a piece of jewelry stamped or described as palladium, it would be important to know how much palladium it contains. Harris Interactive Report, p. 34.
[8] Fed. Reg. Vol. 75, No. 248, December 28, 2010, at 81,450, n. 100.

indicates that two-thirds of respondents cited percentage as the preferred vehicle of disclosure for the content of precious/non-precious metal alloys.[9]

Additionally, 74% of respondents expect that when buying jewelry that contains two precious metals, the order that the metals are listed indicates the relative quantities of the metals.[10] Therefore, we not only recommend that products made with less than the minimum standard for precious metal be stated in percentage, but also recommend that the metals be listed in relative content order so that consumer expectations are met. Allowing the use of percentage for these below-threshold products would create a uniform and concise method of expression across all of the precious metals.

4. Would consumers fully comprehend the meaning of a gold content disclosure that is stated as a percentage, rather than karats (e.g., "33% gold" versus "8 karats")?

(a) Provide any evidence supporting your position.

Most consumers are familiar with percentages. On the other hand, the karat fineness system continues to be a confusing means to express purity of precious metal to a large portion of the U.S. population. While consumers understand that 18 karat gold is more valuable than 10 karat gold, for example, many cannot correctly identify the actual gold content in each of those designations.[11] Furthermore, consumers do not fully understand the definition of a karat when used to describe gold.[12] Thus, requiring disclosure of precious metal content in percentages in below-threshold metal alloys serves

[9] Harris Interactive Report, p. 29, Association Response.
[10] Harris Interactive Report, p. 30, Association Response.
[11] When asked how much gold is in 14K gold, 71.1% of respondents could not correctly answer the question. 28.1% thought that 14K referred to 14% gold, while 16% of respondents thought that 14K was 100% gold. Google Insight Research, Exhibit 1, p.3.
[12] Only 37.5% of respondents were able to correctly identify "purity of the gold" as the correct definition of a karat. Google Insight Research, Exh. 1, p.4. Although 53.9% of respondents preferred gold content to be listed in karats, their unfamiliarity with the meaning of the term karat indicates that percentage would be the more useful indicator in a jewelry product with multiple below-threshold precious metals. Google Insight Research, Exh. 1, p. 6.

two purposes: it communicates clear information about gold content, and allows harmonization across all precious metals.[13]

5. Should the Guides address surface-layer applications of precious metals other than gold and silver (e.g., platinum, palladium, iridium, rhodium, ruthenium, or osmium)?

(a) If so, why? What guidance would be necessary to avoid consumer deception?

(b) If not, why not?

(c) Provide any evidence supporting your position.

As stated in the Association Response, it is important for the Guides to address surface-layer applications of precious metals in addition to those currently provided for gold and silver. The high price of precious metals has led to a large increase in product choices that contain a surface-layer application of precious metal (other than gold or silver) over an underlying, less expensive, metal.[14] It is imperative that the Guides address these products as the current lack of regulation and standards leads to consumer deception regarding both content and durability.

As has been demonstrated, many precious metals are being used for plating. For example, the practice of rhodium-plating over precious metal to enhance the white color is commonplace.[15] Consumers,

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[13] Nothing in this submission should be construed to indicate that the Signatories advocate for the elimination of existing systems for describing precious metals in alloys that meet the standards set forth in the Guides (e.g. 14K gold, 500PT.)

[14] For example, a search for platinum-plated jewelry on Amazon.com provides 19,295 results. http://www.amazon.com/s/ref=nb_sb_noss_2?url=search-alias%3Daps&field-keywords=platinum+plated&rh=i%3Aaps%2Ck%3Aplatinum+plated. The increase in the use of palladium has also led to a marketplace for both palladium-plated jewelry and jewelry with other precious metals plated over a base of palladium. For further examples of the proliferation of palladium in the jewelry industry and regarding the widespread use, generally, of a variety of precious metals to coat an underlying, less expensive metal, see Association Response, pp. 11-12.

[15] A search for "rhodium plated jewelry" on amazon.com yields 135,335 results. http://www.amazon.com/s/ref=nb_sb_noss?url=search-alias%3Daps&field-keywords=rhodium+plated+jewelry&rh=i%3Aaps%2Ck%3Arhodium+plated+jewelry. This practice is most commonly used for white gold, which has a pale yellow color. However, we are now also seeing rhodium plating used over sterling silver. *See, e.g.*, QVC http://community.qvc.com/forums/diamonique/topic/318149/confused-re-rhodium-plating-over-sterling-silver-rings.aspx. Once the rhodium plating wears away, the sterling silver will tarnish, and the product must be re-plated in order to retain the full white color.

however, are frequently not told about this practice.[16] Rhodium plating can (and often does) wear away with use. Consumers are also unaware that when the rhodium plating wears away, jewelry can be re-plated for a reasonable fee.[17] The Association Response advocates the disclosure of rhodium plating in order to protect and educate consumers about these facts. Standards for purity and thickness should be required across the board for the same reasons: in order to protect and educate consumers.

6. Section 23.4(c)(3) of the Guides states that a marketer can mark or describe a product as "rolled gold plate," without also disclosing as a fraction the portion of the weight of the metal accounted for by the plating in the entire article, when such plating constitutes at least 1/20th of the weight of the metal in the entire article *and when the term is appropriately marked with a karat fineness designation. JVC, however, suggested that marketers should be able to describe a product as "rolled gold plate" when such plating constitutes at least 1/40th of the weight of the metal in the entire article.*

(a) What amount of plating on a product described as "rolled gold plate" is necessary to assure reasonable durability of coverage?

(b) How do consumers comprehend the term "rolled gold plate"?

(c) Provide any evidence supporting your position.

The amount of surface layer required to assure durability for products with mechanical applications of gold, including rolled gold plate, is 170 µin (4.32 µ).[18] Note that this differs from the recommendation we made in the Association Response regarding mechanical applications of precious metals. At that time we recommended that the disclosure be made if the weight ratio of precious metal to the metal in the entire product fell below 1/40th. As a result of testing, and further discussion, it is now believed that the disclosure

[16] 55% of consumers have never heard of rhodium plating. Harris Interactive Report, p. 27. There is currently no requirement to disclose rhodium plating to the consumer; the Association Response advocates that this disclosure be required.
[17] For example, one U.S. jeweler expects that rhodium plating should cost somewhere between $25.00 and $65.00, depending on the size of the item and the current cost of rhodium. *See* http://www.knoxjewelers.biz/blog/ring-metals-metal-characteristics/how-often-will-my-white-gold-ring-need-to-be-rhodium-plated/.
[18] The symbol "µ" is an abbreviation for "micron" and the symbol "µin" is an abbreviation for "microinch."

should be triggered by a thickness and not a weight ratio.[19] See the statement of Grigory Raykhtsaum and his report of May 25, 2013, Exhibits 4 and 5, respectively.

Consumers are confused by the preponderance of terms used to describe plated products. 61% of consumers had never heard of rolled gold plate, and only 12% described themselves as "very or extremely familiar" with this term.[20] Consumers do not find this term helpful when attempting to determine the identity of the metal content or the amount of the metal in the product. [21] Since consumers to not understand the unqualified term "rolled plate," it is unlikely they understand it any better when it is qualified with the designation of "1/40." Within the industry, the term "rolled gold plate" is used, without any qualification, for products with weight ratios of both 1/20th and 1/40th. Allowing the use of "rolled gold plate," without qualification, for products with weight ratios as low as 1/40th serves the dual purpose of aligning the Guides with industry practice, and simplifying them – without causing detriment to consumers. Consumer interests are served by our accompanying recommendation for certain thicknesses of surface applications: that sellers disclose when durability is not assured.

7. Is the term "rolled plate" used to describe surface applications of other precious metals, such as silver or platinum group metals?

(a) If so, what amount of plating is necessary to assure reasonable durability of coverage on such products?

(b) *Does the amount of plating needed to assure durability differ depending on the metals used?*

(c) How do consumers comprehend the term "rolled plate" when used to describe surface applications of other precious metals?

(d) Provide any evidence supporting your position.

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[19] It should be noted that disclosure of weight ratios (the weight of precious metal used compared to the weight of the entire article) is meaningless to consumers, but is relevant to manufacturers, who are bound to apply sufficient weights of precious metals at or above the accepted minimum standards, such as 10K gold. The weight fraction applies to the weight of the entire article.

[20] Harris Interactive Report, p. 27, Association Response.

[21] Harris Interactive Report, p. 28, Association Response.

The term rolled plate is occasionally used to describe silver plate.[22] The amount of surface layer required to assure durability for products with mechanical applications of silver is 250 µin (6.35 µ). The platinum group metals are not often used in mechanical applications as the process is technologically difficult. There would, however, likely be a market for products with coatings of platinum group metals as they are very desirable. Anticipating that the technology will catch up with demand, the same standard recommended for gold – 170 µin (4.32 µ) – should apply to platinum and palladium.[23] See the statement of Grigory Raykhtsaum and his report of May 25, 2013, Exhibits 4 and 5, respectively, supporting our recommendations regarding mechanical applications of precious metals, including silver, platinum and palladium.

As detailed above in the response to question 6, when the Associations tested the meaning of certain terms for the original submission, it was clear that consumers were unaware of their meaning. 61% of consumers had never heard of rolled gold plate, and since other rolled plate products are even less common, it is safe to assume that awareness of any other rolled plate would remain low.

Nonetheless, we recommend that most terms used to describe an application of precious metal over an underlying metal – including "rolled plate" – be described in a way to include all precious metals, not just gold.[24] This reflects current trends, and anticipates the increased use and variety of precious metals coatings on jewelry products.[25]

8. The current Guides do not address the term "bonded." JVC stated this term "indicates a durable product with a mechanically applied application of gold or gold alloy over a base of sterling silver that is at least 1/40th of the weight of the article," and proposed that use of the term also be permitted for surface applications of precious metals other than gold.

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[22] *See, e.g.,* http://www.ehow.com/about_6399212_difference-between-real-silverplate-electroplate.html
[23] Rhodium and ruthenium are not likely candidates for use in mechanical applications as both are particularly difficult to work with in that context. See Raykhtsaum Statement, Exhibit 4.
[24] The exception is "vermeil," which is widely known and accepted in the industry as an electrolytic application of gold or gold alloy over silver and is not used for products with any other metal combinations. *See* § 23.5 of the Guides.
[25] See Association Response, at pages 11-12.

(a) Is the term "bonded" used to describe surface applications of other precious metals, such as silver or platinum group metals?

(b) What amount of plating on a product described as "bonded" is necessary to assure reasonable durability of coverage?

(c) Does the amount of plating needed to assure durability differ depending on the metals used? If so, how does it differ?

(d) How do consumers comprehend the term "bonded"?

(e) Provide any evidence supporting your position.

Currently, bonded is used within the industry to describe precious metal mechanically bonded to sterling silver at a weight ratio of 1/40th. We expect that consumers will become increasingly familiar with the term. Bonded products are actively marketed and industry efforts are underway to educate buyers about the meaning of the term.[26] Currently, it is technologically difficult to mechanically apply either platinum or palladium to create a bonded product, but efforts are underway to overcome those difficulties. For this reason we recommend that the term "bonded" apply to any precious metal applied to sterling silver if the weight ratio is at least 1/40th.

The amount of gold required to assure durability on a bonded product is a thickness of 170 μin (4.32 μ). The same minimum would apply to platinum and palladium. See the statement of Grigory Raykhtsaum and his report of May 25, 2013, Exhibits 4 and 5, respectively.

9. The current Guides do not address the term "clad." JVC recommended marketers state a product is "[precious metal] clad" when the applied precious metal is at least 1/20th of the weight of the article.

(a) What amount of plating on a product described as "clad" is necessary to assure reasonable durability of coverage?

[26] See, for example, http://www.bondedinfo.com/, a Richline Group website.

(b) Does the amount of plating needed to assure durability differ depending on the metals used? If so, how does it differ?

(c) How do consumers comprehend the term "clad"?

(d) Provide any evidence supporting your position.

The durability of mechanical applications of gold, platinum and palladium is assured at a thickness of 170 µin (4.32 µ). For silver, the minimum required to assure durability is 250 µin (6.35 µ). Our recommendation that the term "clad" and "filled" be confined to precious metal applications that are at least 1/20 the weight of the entire article is based not on durability, but industry use of the term. Please see the statement of Grigory Raykhtsaum included with the Association Response, Exhibit 8, pp. 3-4.

10. Should the Guides continue to provide guidance on use of the terms "flashed," "washed," "overlay," "Duragold," "Diragold," "Noblegold," "Goldine," or "layered gold"?

(a) If so, why? If not, why not?

(b) How do consumers comprehend these terms?

(c) Provide any evidence supporting your position.

The Signatories recommended that there no longer be guidance on the use of these terms as they are archaic and no longer frequently used by the industry. Additionally, these terms are confusing to consumers, as they convey no specific information about the precious metal content of jewelry and have no plain English meaning that is useful to the consumer. Consumers do not understand these terms; for example, when tested, only 15% were familiar with "gold washed."[27] These terms do not provide any information, and only serve to confuse consumers.

The intent of the Association Response previously submitted on the subject of surface applications of precious metals was to set baseline minimum standards for thickness, weight and purity to provide a unified and less complex system, and to set standards for manufacture that ensure durability. With a minimum standard in place for all precious metals, all plated products will have clear information regarding

[27] Harris Interactive Report, p. 27, Association Response.

reasonable durability, and setting specific standards for these archaic terms to describe plated products will no longer be necessary.

Should the Commission decline to set uniform guidelines across all precious metals, the Signatories recommend that the Guides continue to include information regarding these terms.

11. Sterling/Richline suggested that standards for certain terms used to describe gold electrolytic plating applications ("plate," "plated," "electroplate," "electroplated," "heavy electroplate," "heavy electroplated," and "vermeil") should be stated in terms of "fine gold," which has a 23.5 karat minimum. Do the current Guides provisions regarding these terms, which refer to platings or coatings of "gold" or "gold alloy of not less than 10 karat fineness" create consumer confusion or cause consumer injury?

(a) If so, how? What is the injury to consumers?

(b) Provide any evidence supporting your position.

It is unlikely that consumers will comprehend provisions that govern the quality of "fine gold" for plate, electroplate, heavy electroplate and vermeil; nor does the interface of those terms with a "fine gold" requirement provide useful information to manufacturers. This is especially true due to the "equivalency" language of § 23.4(c)(2) and (4) and the provisions on vermeil in § 23.5 which allow standards pertaining to the weight of the plating instead of the fineness, which, in effect, allow the coating to be as low as 10 karats as long as there is more of it. This concept likely seems contradictory to consumers and is not even fully understood within the industry. Therefore, we agree with Sterling/Richline that there be a minimum quality standard for electrolytic applications of gold, although the signatories assert that the minimum be set at 22 karats rather than 23.5 karats as recommended by Sterling/Richline.[28] Additionally, we recommend that the FTC remove language about "equivalents" (as outlined in § 23.4(c)(2) and (4) of the Guides) as it is confusing, and would allow for lower quality plating as long as there was more total gold by weight. This language is unclear, and likely to lead to manufacturers creating plated products by simply layering more gold alloy on a plated piece in order to meet the equivalency provisions, but which will likely tarnish and not

[28] Statement of Michael Akkaoui, Exhibit 6.

meet consumer expectations.

12. Should the Guides advise marketers to disclose that the durability of a surface application of precious metal is not assured if suggested thickness or weight minimums are not met?

(a) If so, why? If not, why not?

(b) Would the issuance of guidance calling for such disclosure affect the costs and benefits of the Guides for consumers and businesses, particularly small businesses? If so, how?

(c) Provide any evidence supporting your position.

The Association Response made the recommendation that this disclosure was necessary in conjunction with the recommendation allowing manufacturers the freedom to apply surface layers of precious metals that are less than standard thicknesses or weights. The ultimate goal of the Guides is not to restrict manufacturing, but to ensure that marketers understand the standards and guidelines to avoid deceptive trade practices. Unless this disclosure is made for these below minimum products, consumers will be deceived into believing that they are buying products that will perform as well as other, higher quality products.

Thus, requiring this disclosure would communicate vital information about the durability of the product while still allowing for a market for lower-cost goods. Because of the high cost of precious metals, manufacturers are looking to these lower-cost alternatives in order to meet price points demanded by consumers. Allowing for their manufacture while providing for consumer education balances the two aims of the industry as a whole. Of course, there would be a small cost to all manufacturers, distributors and retailers in that they would need to ensure that this information is communicated to the consumer (whether via marketing material, product tags, or otherwise). However, the benefits of complete disclosure to consumers outweigh the minimal costs.

Attached to this submission are reports of abrasion wear tests conducted by the Materials Test and Measurement Division of Taber Industries, vibration wear tests conducted by Tanury Industries, and wear tests conducted by Leach Garner. (Exhibits 8, 7 and 5, respectively). The purpose of the tests was to establish wear rates of products with applications of precious metals. A description of the testing methods, sample selection, and results follows.

ELECTROLYTIC APPLICATIONS OF PRECIOUS METALS

Taber Industries Abrasion Wear Tests

Taber Industries, founded in 1941, uses instruments of its own manufacture and design to independently test the physical properties of products, such as resistance to abrasion and wear. The equipment used by Taber to test the samples submitted by the Task Force, the Taber Linear Abraser Model 5750, is designed to measure abrasion resistance by determining how various products gradually wear under the same conditions. In layman's terms, the surface of each sample was exposed to an abrasive motion that was similar to rubbing the object with a dirty finger, or with an eraser. The abrasive material is comparable in some respects to a liquid used by jewelers to polish precious metal (called jewelers' "rouge"), except that the abrading material is in a rubber, not a liquid base.

The testing procedure can determine, for example, to what extent an application of a specific thickness of gold alloy on nickel is more abrasion resistant than an application of a thinner application of the same alloy. This is done by exposing the surface to repeated cycles of abrasion, and counting the number of cycles until the "cut-through," or "failure" point is reached and the nickel is visible, allowing for a comparison of durability.

Tanury Industries Vibration Wear Tests

Tanury Industries specializes in metal finishing and surface-layer applications of metals. It conducted a vibration wear test on a set of samples that was identical to those tested by Taber Industries. Vibration testing is the process of applying a controlled amount of vibration to a test specimen, usually for the purposes of establishing reliability.

The Samples

Taber Industries and Tanury Industries tested six pairs of duplicate samples, for a total of 12 samples each. The samples each consisted of a base metal covered with an electrolytic application of precious metal. In each pair, one of the samples contained the minimum amount of precious metal recommended by the Signatories, below which marketers would be advised to disclose that durability is not assured. The second sample in each pair contained less than the minimum amount recommended by the Signatories. For example, one of the pairs consists of two samples of copper, each with an electrolytic application of platinum. On one sample, the thickness of the application is .127µ (5µin), the Signatories' recommended minimum for platinum before disclosure is required. On the other sample in the pair the thickness is .05µ (2µin), less than the recommended minimum.

The surface coatings of precious metal were uniform in thickness across each sample. In the case of actual jewelry products, however, the surface layer is often not uniform in thickness, and may vary by a few microns on a particular piece of jewelry. Thus, a product that is surface coated with a specified amount of platinum is likely to have that thickness of platinum, or more, in some areas, but less in others. The thickness of the precious metal on the "below minimum" testing samples was determined with that in mind. In the case of platinum, the recommended minimum is .127µ (5µin). The "below minimum" sample contains .05µ (2µin). This spread between samples, .077µ (3.032µin), minimal as it is, accounts for the uneven nature of a precious metal application on actual jewelry.[29]

Another consideration in determining the thickness of the precious metal on the "below minimum samples" was industry practice. For example, although there is no specific FTC standard regarding "Gold Flashed," products described with that term are typically coated with .025µ to .076µ (1µin to 3µin) of gold alloy. For that reason, the "under minimum" sample used to test electrolytic applications of gold alloy contains a surface-layer of .05µ (2µin).

The underlying base metal used for the samples coated with silver and with each of the platinum group metals, which are all white, was copper, which is yellow. The underlying base metal used for the samples of gold, which is yellow, was nickel, which is white. The contrasting colors were chosen so that the tester would be able to see when the cut-through (failure) point was reached, meaning the point where the precious metal is worn away and the substrate is visible.

[29] By way of comparison, a very fine human hair is about 17µ (669µin).

The following chart lists each of the 12 duplicate samples tested by Taber Industries and Tanury Industries:

SAMPLES – ELECTROLYTIC APPLICATIONS		
Surface-Layer	**Thickness of Surface Layer in Sample 1 (recommended minimum)**	**Thickness of Surface Layer in Sample 2 (disclosure recommended)**
23K Gold	.175μ (7μin)	.05μ (2μin)
Platinum	.127μ (5μin)	.05μ (2μin)
Silver	2.54μ (100μin)	1μ (40μin)
Palladium	.127μ (5μin)	.05μ (2μin)
Rhodium	.076μ (3μin)	.025μ (1μin)
Ruthenium	.127μ (5μin)	.05μ (2μin)

MECHANICAL APPLICATIONS OF PRECIOUS METALS

Leach Garner Wear Test

Leach Garner is a company that specializes in gold, silver, gold-filled applications, and alloys, as well as the production of precious metal beads, findings[30] and chains for use in the jewelry industry. Its specialties include mechanical applications of precious metals on jewelry products. Leach Garner's wear test was conducted by placing samples inside a bowl with walnut shells and a moderately abrasive paste. The contents were spun, causing the removal of the precious metal surface layer over time. While testing was performed by Leach Garner of samples with both electrolytic and mechanically applied surface layers of precious metals, this discussion focuses on the samples with mechanical applications.

Samples (Mechanical Applications)

The relevant samples consisted of brass discs with surface-layer applications of 14K gold, and a brass disc with a surface-layer application of sterling silver. The following chart lists the samples with mechanical applications of precious metals tested by Leach Garner.

[30] "Findings" are the small parts used to join jewelry components together to form a completed article.

SAMPLES – MECHANICAL APPLICATIONS	
Precious Metal in Surface Layer	Thickness of Surface Layer
Sterling Silver Clad (weight ratio of 1/10th)	1686 µin (43 µ)
14K Gold Filled (weight ratio 1/20th)	860 µin (23 µ)
14K Rolled Gold Plate (weight ratio 1/40th)	586 µin (15 µ)

TEST RESULTS AND ANALYSIS

Analyses of the results are discussed in Exhibit 6, the report of Michael Akkaoui of Tanury Industries, and in Exhibit 4, the statement of Grigory Raykhtsaum. The test results and analysis support the Signatories' recommendation that marketers disclose that durability is not assured when electrolytic applications dip below the thickness minimums detailed in the Association Response, Exhibit 1, at §23.7. They further support our recommendation urged in this submission that the same disclosure be made when mechanical applications dip below 170 µin (4.32 µ) for karat gold, platinum and palladium applications, and below 250 µin (6.35 µ) for silver applications.

13. To the extent not addressed in your previous answers, please explain whether and how the Commission should revise the Guides to prevent consumer deception with respect to the marketing and sale of jewelry industry products that have a surface-layer application of precious metal.

III. Conclusion

For the reasons expressed above, we ask that the Commission to accept the recommendations made in this submission. Thank you for your consideration of this important request.

Respectfully submitted:

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Mark Hanna

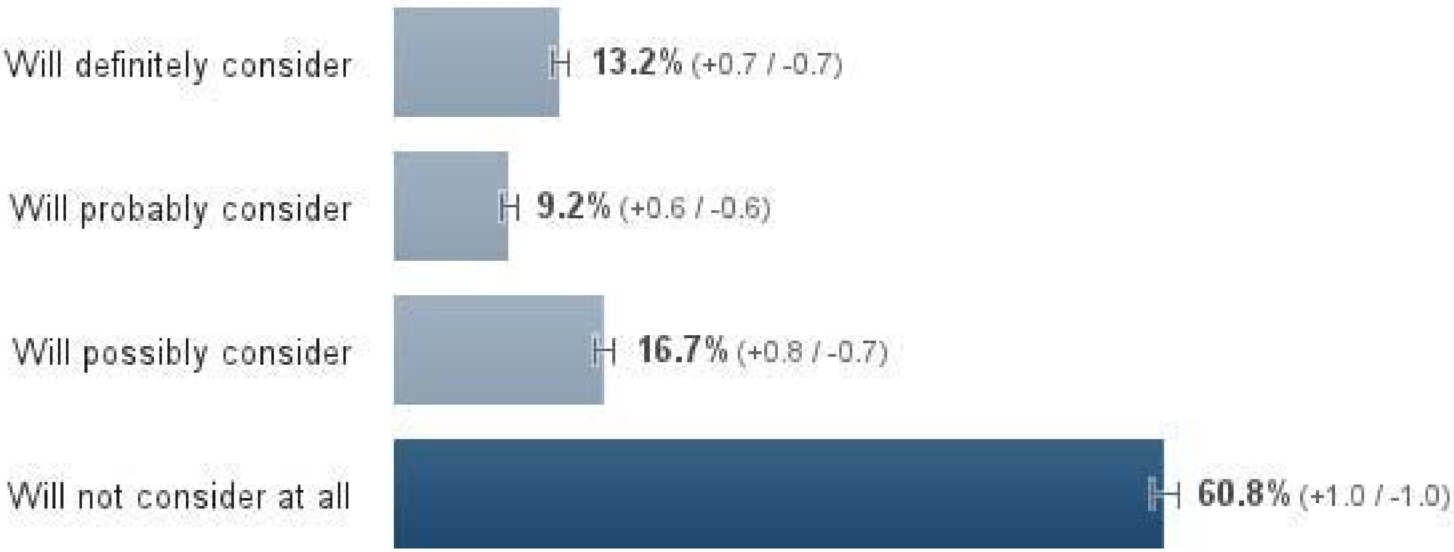
Chief Marketing Officer, Richline Group, Inc.

SINGLE ANSWER

How likely are you to consider purchasing fine jewelry, either for yourself or someone else, in the future?

Results for all respondents. Weighting: Off. (9436 responses)

Order statistically significant.



	All (9436)
Will definitely consider	13.2% (+0.7 / -0.7)
Will probably consider	9.2% (+0.6 / -0.6)
Will possibly consider	16.7% (+0.8 / -0.7)
Will not consider at all	60.8% (+1.0 / -1.0)

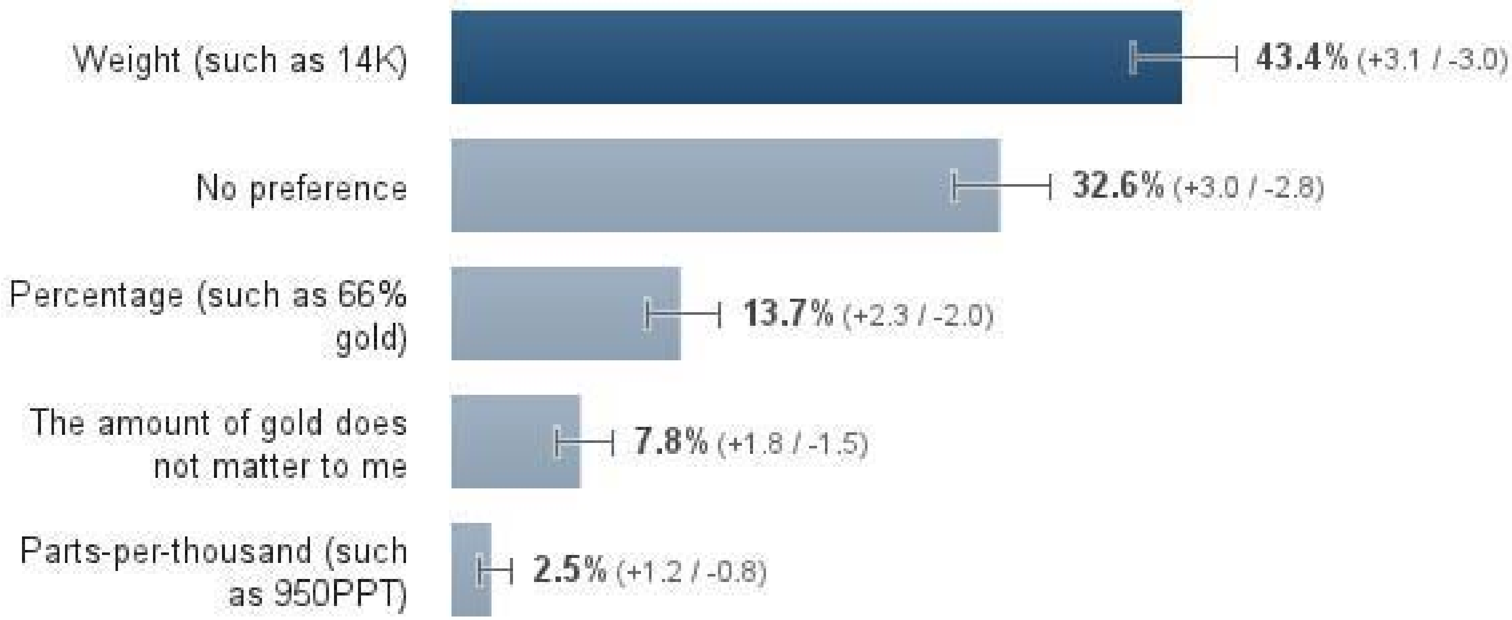
Methodology: Conducted by Google Consumer Surveys, May 14, 2013 - June 04, 2013 and based on 9436 online responses. Sample: National adult Internet population.

SINGLE ANSWER

In a metal jewelry product containing gold, is it more important to have the gold content listed by weight, by percentage, or by parts-per-thousand?

Results for all respondents. Weighting: Off. (1000 responses)

Order statistically significant.



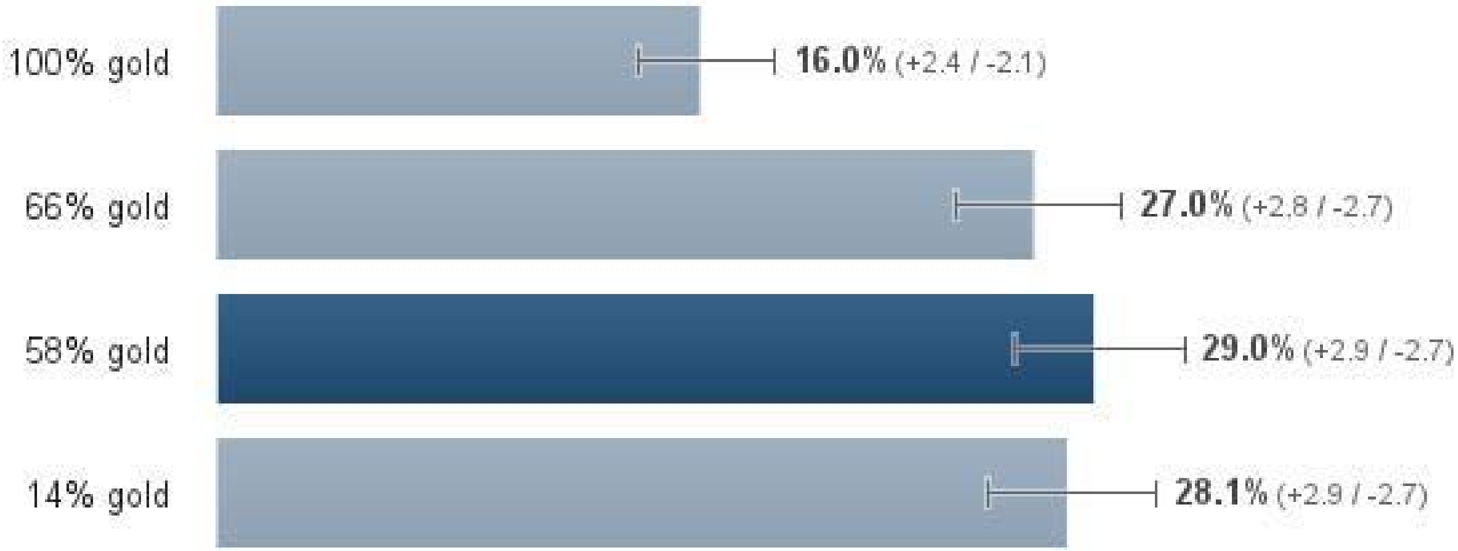
	All (1000)
Weight (such as 14K)	43.4% (+3.1 / -3.0)
No preference	32.6% (+3.0 / -2.8)
Percentage (such as 66% gold)	13.7% (+2.3 / -2.0)
The amount of gold does not matter to me	7.8% (+1.8 / -1.5)
Parts-per-thousand (such as 950PPT)	2.5% (+1.2 / -0.8)

Methodology: Conducted by Google Consumer Surveys, May 14, 2013 - May 23, 2013 and based on 1000 online responses. Sample: National adult Internet population.

SINGLE ANSWER

How much gold is in 14K gold?

Results for all respondents. Weighting: Off. (1001 responses)
Confidence too close to call.



	All (1001)
100% gold	16.0% (+2.4 / -2.1)
66% gold	27.0% (+2.8 / -2.7)
58% gold	29.0% (+2.9 / -2.7)
14% gold	28.1% (+2.9 / -2.7)

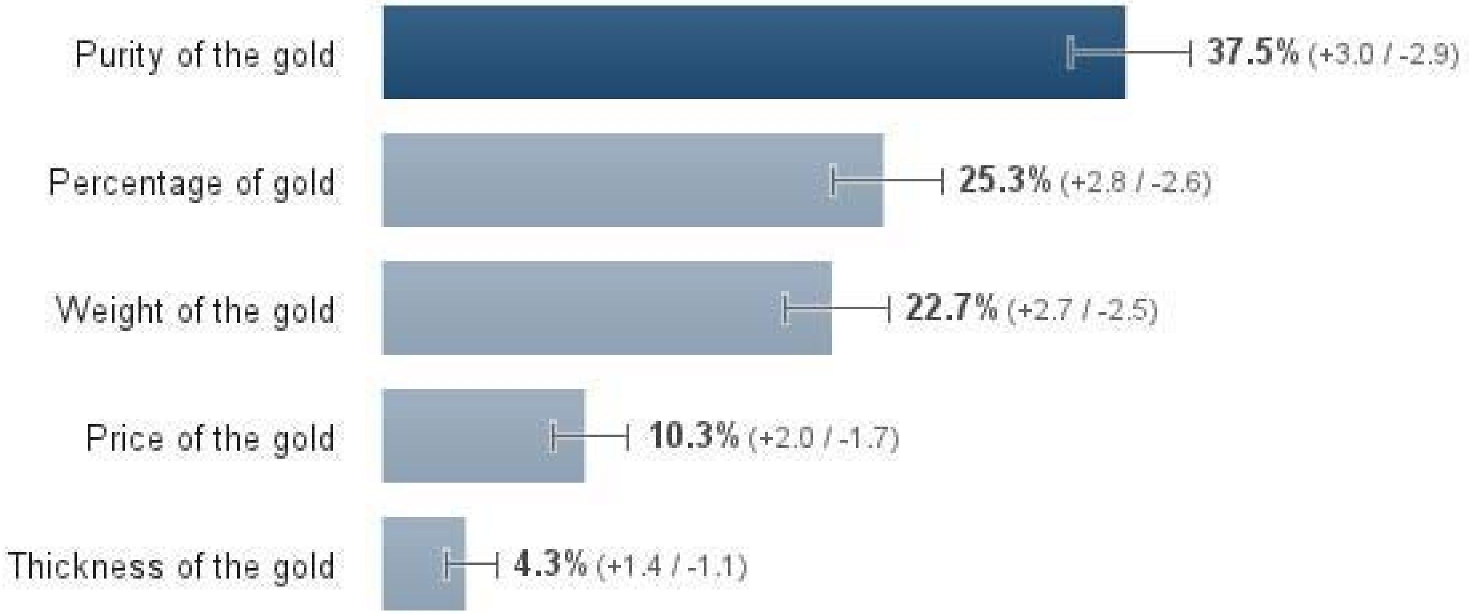
Methodology: Conducted by Google Consumer Surveys, May 14, 2013 - May 23, 2013 and based on 1001 online responses. Sample: National adult Internet population.

SINGLE ANSWER

Imagine that you are told that a piece of jewelry contains a certain number of karats of gold. What does 'karat' indicate?

Results for all respondents. Weighting: Off. (1001 responses)

Winner statistically significant.



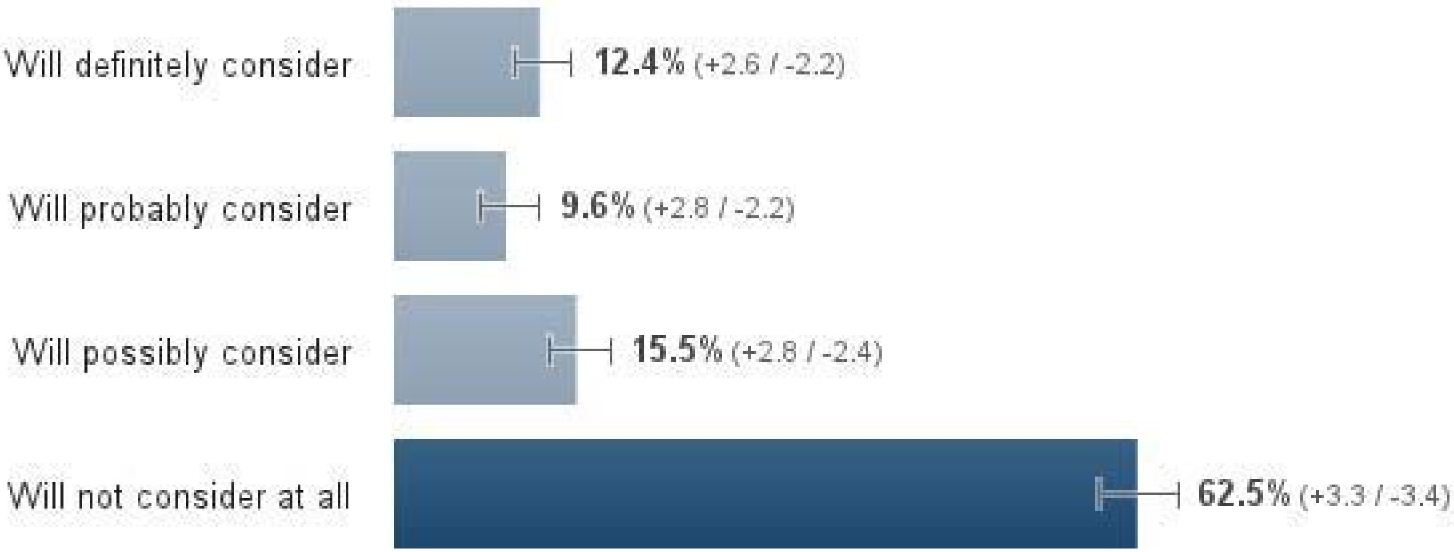
	All (1001)
Purity of the gold	37.5% (+3.0 / -2.9)
Percentage of gold	25.3% (+2.8 / -2.6)
Weight of the gold	22.7% (+2.7 / -2.5)
Price of the gold	10.3% (+2.0 / -1.7)
Thickness of the gold	4.3% (+1.4 / -1.1)

Methodology: Conducted by Google Consumer Surveys, May 14, 2013 - May 23, 2013 and based on 1001 online responses. Sample: National adult Internet population.

SINGLE ANSWER

How likely are you to consider purchasing fine jewelry, either for yourself or someone else, in the future?

Results for respondents with demographics. Weighted by Age, Gender, Region. (1032 responses)
Order statistically significant.



	All (1032)
Will definitely consider	12.4% (+2.6 / -2.2)
Will probably consider	9.6% (+2.8 / -2.2)
Will possibly consider	15.5% (+2.8 / -2.4)
Will not consider at all	62.5% (+3.3 / -3.4)

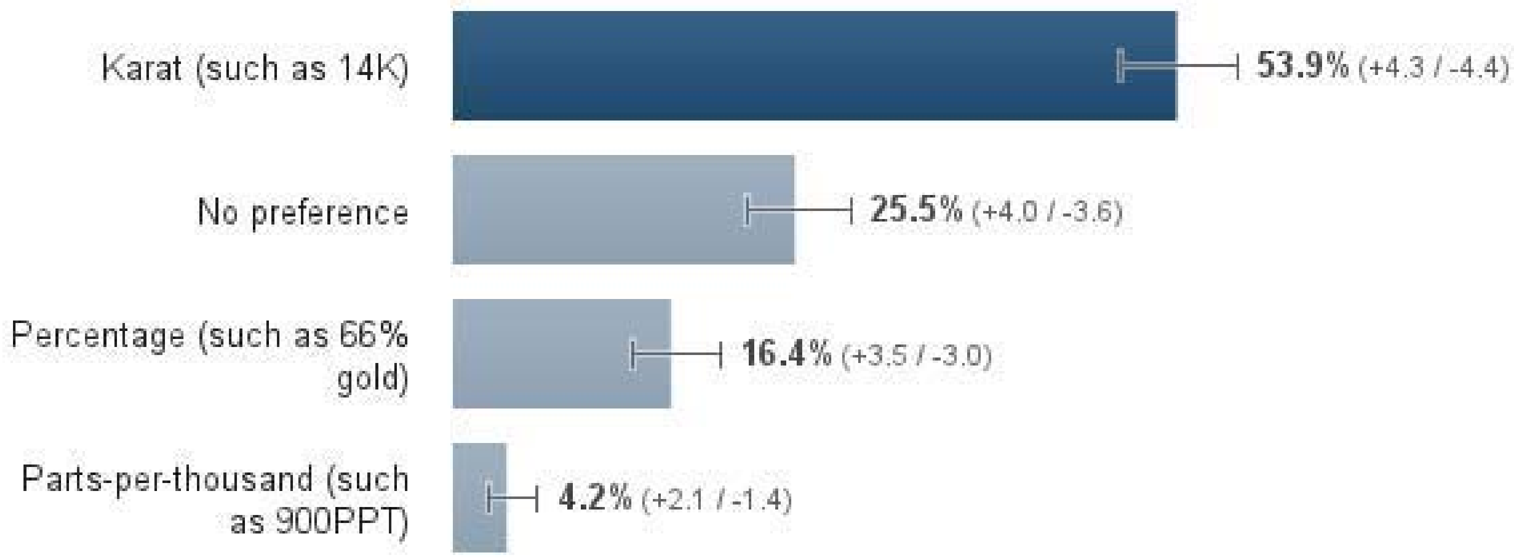
Methodology: Conducted by Google Consumer Surveys, May 22, 2013 - June 04, 2013 and based on 1032 online responses. Sample: National adult Internet population.

SINGLE ANSWER

In a metal jewelry product containing gold, how would you prefer to see the gold content described?

Results for all respondents. Weighting: Off. (501 responses)

Order statistically significant.



	All (501)
Karat (such as 14K)	53.9% (+4.3 / -4.4)
No preference	25.5% (+4.0 / -3.6)
Percentage (such as 66% gold)	16.4% (+3.5 / -3.0)
Parts-per-thousand (such as 900PPT)	4.2% (+2.1 / -1.4)

Methodology: Conducted by Google Consumer Surveys, May 22, 2013 - May 27, 2013 and based on 501 online responses. Sample: National adult Internet population.

Exhibit 2 consists of two Microsoft Excel files from Google Insights containing the raw data from the additional consumer research performed from May 14-June 4, 2013. These files have been separately uploaded to the Federal Trade Commission's website.

Google

Comparing Google Consumer Surveys to Existing Probability and Non-Probability Based Internet Surveys

Paul McDonald, Matt Mohebbi, Brett Slatkin
Google Inc.

Abstract
This study compares the responses of a probability based Internet panel, a non-probability based Internet panel and Google Consumer Surveys against several media consumption and health benchmarks. The Consumer Surveys results were found to be more accurate than both the probability and non-probability based Internet panels in three separate measures: average absolute error (distance from the benchmark), largest absolute error, and percent of responses within 3.5 percentage points of the benchmark. These results suggest that despite differences in survey methodology, Consumer Surveys can be used in place of more traditional Internet based panels without sacrificing accuracy.

This is an updated version of the orginal whitepaper. The original whitepaper is located here:
http://www.google.com/insights/consumersurveys/static/consumer_surveys_whitepaper.pdf

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Introduction

Data collection for survey research has evolved several times over the history of the field, from face-to-face interviews and paper based surveying initially, to telephone based surveying starting in the 1970s to Internet-based surveying in the last 10 years. Three factors appear to have played a role in these transitions: data quality, data collection cost and data timeliness.

The Internet has the potential to collect data faster, with similar data quality and less cost. Chang and Krosnick (2009) compared random digit dialing (RDD), a probability based Internet survey (where respondents are chosen to be representative of the population) and a non-probability based Internet survey (where no effort is made to ensure the sample is representative) over the course of the 2000 presidential election. They found the probability based Internet survey produced results that were more closely aligned with actual voting behavior than RDD and non-probability based surveying.

However, there continue to be challenges with Internet surveys. Bias can be introduced into surveys when attempting to represent the entire U.S. population. While Internet use in the United States is approaching 78% of adults, these Internet users tend to be younger, more educated, and have higher incomes (Pew, 2011). Despite these challenges, for many types of surveys, the trade-off between acquiring the most representative sample and acquiring a sample quickly and inexpensively has led many commercial and academic institutions to favor these Internet based surveys.

In this paper, we introduce Google Consumer Surveys, a new method for performing probability based Internet surveying which produces timely and cost-effective results while still maintaining much of the accuracy of pre-existing surveying techniques. Section one provides an overview of the product, including survey sampling, data collection and post-stratification weighting. Section two compares the results obtained from Consumer Surveys to well known baselines and results obtained from other commercial Internet based surveying techniques. Section three provides a summary of the system along with its limitations.

Section I: Google Consumer Surveys Overview

Product summary

The core of Consumer Surveys is a “surveywall.” A surveywall is similar to the paywalls used by publishers to gate access to premium content but rather than requiring payment or subscription, visitors can instead choose to answer one or two survey questions. By reducing the burden to just one or two clicks, we increase the response rate of the survey. In conducted trials, the average response rate[1] was 23.1% compared to the latest industry response rates of less than 1% for most Internet intercept surveys (Lavrakas, 2010), 7-14% for telephone surveys (Pew, 2011. Pew, 2012) and 15% for Internet panels (Gallup, 2012).

Consumer Surveys involves three different groups of users: researchers, publishers, and consumers. Researchers come to Consumer Surveys and pay to have consumers answer them. Consumers encounter these survey questions on publisher websites and answer questions in order to obtain access to the publisher content. Publishers sign up for Consumer Surveys and are paid by Google to have surveys delivered to their site. Thus, Consumer Surveys provides a new way for researchers to perform Internet surveys, for publishers to monetize their content and for consumers to support publishers.

Data collection

Many researchers perform multi-question surveys in which the same respondent is asked to fill out a several minute questionnaire. With Consumer Surveys, researchers create and run multi-question surveys but the system only asks users one or two questions per request. Two-question surveys are called screening surveys and require the first question to be a multiple choice question (single answer) with one or more target answers. Both the sole question of a single question survey and the second question of a screening survey can be of the form multiple choice, image choice, Likert rating scale (5 or 7 points) or a open-ended numeric question. The completion rate for screening surveys average 18.43% but trial participants have expressed that the value of the screening question outweighs the increased non-response.

Unlike traditional surveys which explicitly ask respondents for demographic and location information, Consumer Surveys infers approximate demographic and location information using the respondent’s IP address[2] and DoubleClick cookie[3]. The respondent’s nearest city can be determined from their IP address. Income and urban density can be computed by mapping the location to census tracts and using the census data to infer income and urban density. Gender and age group[4] can be inferred from the types of pages the respondent has previously visited in the Google Display Network using the DoubleClick cookie.[5] This information is used to ensure each survey receives a representative sample and to enable survey researchers to see how sub-populations answered questions. Inferring this demographic data enables Consumer Surveys researchers to ask fewer questions in a survey which in turn increases response rates.

Sampling

Probability based Internet survey platforms typically recruit respondents via telephone using RDD telephone sampling techniques, but then require that panel members answer surveys online. By contrast,

1 Using Princeton Survey Research Associates International (PSRAI) methodology.

2 A number assigned to a device connected to the internet.

3 An advertising cookie used on AdSense partner sites and certain Google services to help advertisers and publishers serve and manage ads across the web.

4 Age groups supported: 18-24, 25-34, 35-44, 45-54, 55-64, and 65+.

5 See the privacy section for details.

Consumer Surveys makes use of the inferred demographic and location information to employ stratified sampling. The target population for Internet access among the U.S. population of adults is obtained from the most recent Current Population Survey (CPS) Internet use supplement (October 2010) and is formed from the joint distribution of age group, gender and location. Since this inferred demographic and location information can be determined in real time, allocation of a respondent to a survey is also done in real time, enabling a more optimal allocation of respondents across survey questions. This reduces the size of the weights used in post-stratification weighting which in turn reduces the variance introduced by weighting. Consumer Surveys gives researchers the ability to target specific sub-populations through two methods: demographic targeting and screening (described in Data Collection). Demographic targeting enables researchers to target a survey to a specific demographic sub-population (age, gender or location).

Post-stratification weighting

Consumer Surveys uses post-stratification weighting to compensate for sample deficiencies. Although Consumer Surveys attempts to build an optimal allocation of respondents to each question over the life of the survey, this is not always possible in practice due to additional constraints such as completing the survey in a timely manner, publisher inventory at the time, and competition with other surveys. Thus, post-stratification weighting is used to reduce this sample bias. The same CPS Internet target population used in sampling is also used in weighting. To reweight to this population, a simple cell weighting method is used, where cells are formed from a combination of age group, gender and location. The particular combination used for reweighting is a function of the number of respondents for the question and if the population is targeted (e.g. it is not useful to reweight by gender for a survey targeting males). The possible weighting options, ordered by priority, include: (age, gender, state), (age, gender, region), (age, state), (age, region), (age, gender), (age), (region), (gender).[6] The weighting option is automatically chosen for a particular view and is shown as part of the report in Consumer Surveys.

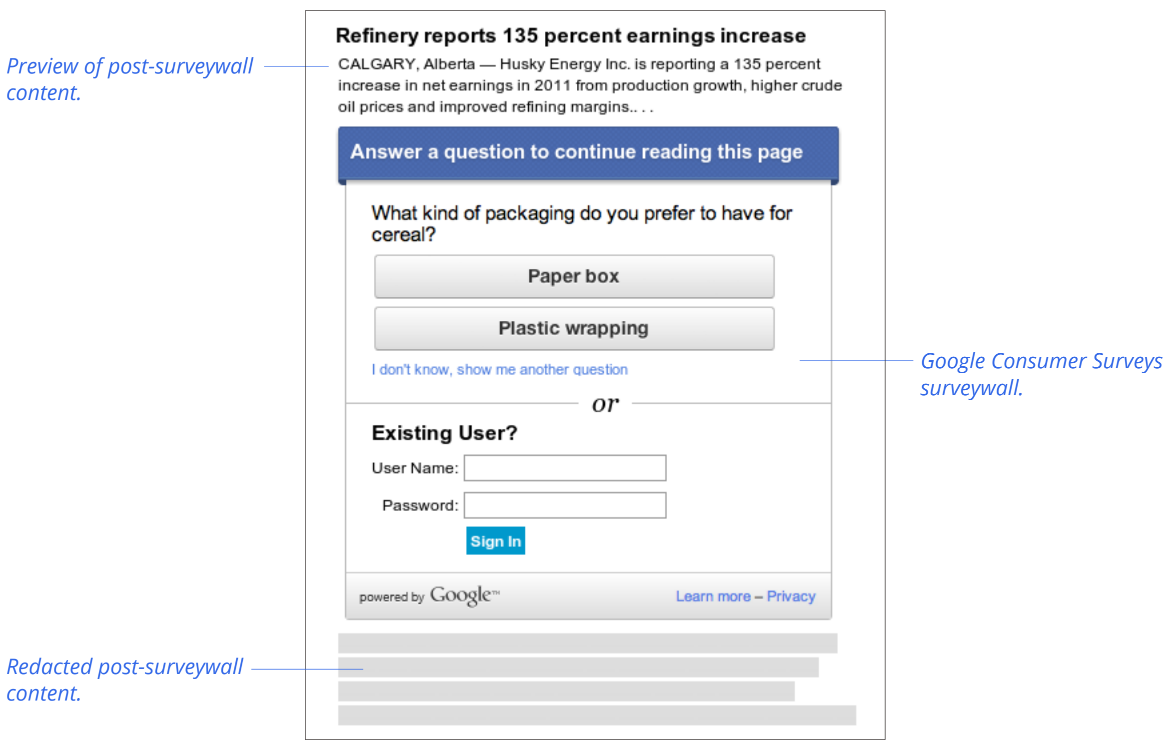

Figure 1. *An example Consumer Surveys surveywall on www.limaohio.com. Once the user has answered this question, they can continue reading the article.*

6 Google Consumer Surveys divides the United States into four regions, West (CA, AK, WA, OR, HI, ID, MT, WY, NV, UT, CO, AZ, NM), Midwest (ND, SD, NE, KS, MO, IA, MN, WI, MI, IL, IN, OH), South (TX, OK, AR, LA, KY, TN, MS, AL, FL, GA, SC, NC, VA, WV, MD, DC, DE) and Northeast (PA, NY, NJ, ME, VT, NH, MA, RI, CT).

Section II: Comparing Google Consumer Surveys to Existing Internet and Telephone Surveys

Method

Respondents

Two survey research firms were hired to administer an identical questionnaire, with one performing a probability based Internet survey and the other a non-probability based Internet survey. Both are well known for administering such surveys and each was asked to provide "1,000-2,000 responses for each question from a representative sample of American adults 18 years and older, residing in the United States."

Consumer Surveys respondents were administered the same questionnaire. This process was repeated thirteen times for Consumer Surveys over the course of eight months to determine the variation of the responses. Each of the Consumer Surveys attempted to represent the U.S. Internet population as determined by the CPS Internet Supplement. The probability sample Internet survey was conducted with members of a panel recruited via RDD methods. Respondents that wanted to participate but did not have a computer or Internet connection were provided with one at no cost. The respondents were a subset of the individuals on the panel and they completed the survey via the Internet. The non-probability sample Internet survey recruited a stratified random sample of respondents via email. Consumer Surveys employed a surveywall on partner publisher sites and blocked access to the content of the site until the user either paid for the content or answered one question from the survey.

Measures

Three questions measuring media consumption were asked in the same questionnaire administered to the probability based panel and the non-probability based panel. The same questions were also asked to the Consumer Surveys respondents; however, questions were asked one at a time and each respondent did not necessarily answer more than one question. Primary demographics (age, gender, income, race, education and location) were captured for each of the respondents in the panel surveys either via the questionnaire or at the time respondents signed up for the panel. Consumer Surveys utilized the users' DoubleClick cookies to infer age and gender. Approximate location was determined using the IP address of the respondent. Income and urban density were computed by mapping the location to census tracts and using the census data to infer income and urban density (for details, see Data Collection in Section I).

Benchmarks

Three media benchmarks were measured in a large (200,000 respondent) semi-annual RDD telephone survey conducted by a respected research provider. The benchmarks measured Video on Demand (VoD), Digital Video Recorder (DVR) and satellite dish usage in American households. Four health benchmarks were also measured against responses drawn from the Consumer Surveys respondents. Large government surveys from the CDC with response rates of over 80% were used to obtain health benchmarks for smoking, asthma, disability and car accident incidence rates.

Weighting

To reduce the effects of non-response and non-coverage bias or under- and over-sampling resulting from the study-specific sample, post-stratification weighting was done on the responses from each of the methodologies. The non-probability panel data was weighted to reflect the latest Census including age, gender, household income, and region. The probability based panel and Consumer Surveys respondents were weighted by the most recent data from the Current Population Survey (CPS) Internet Supplement, including age, gender and geography.

Analysis

Accuracy measure

We considered the media and health benchmarks to be the gold standard and used those determine the error of the various survey platforms by computing the deviations between the benchmarks and the other survey methodologies. For each survey, the average absolute error was computed for each question and the survey as a whole as well as the maximum of the absolute error and the percent of responses within 3.5 percentage points of the benchmarks (Yeager, Krosnick, Chang et al., 2009). The above analyses were first conducted with post-stratification weights on the panel data and the Consumer Surveys data and then repeated without post-stratification weights on the Consumer Surveys data.

Variation between survey platforms

Comparisons of variation between samples on each platform were limited due to the number of surveys run using the probability and non-probability based panels. However, the goal of this study was to compare the differences between platforms so most of the analysis focuses on the differences between the average Consumer Surveys sample and the samples provided by the other platforms. The benchmark and media consumption based surveys were run five times in a six month period to compare the variation of responses across surveys and to measure how the publisher website mix affected the validation metrics. Consumer Surveys were targeted so that some attempted to get a representative sample of the U.S. Internet population while others only asked respondents of a given publisher site. Using this methodology we could test the bias introduced by each publisher independently. Subsequent studies will focus on reducing the bias introduced by individual content providers.

Results

Accuracy across benchmarks

The average absolute error (the absolute difference between the percentage of the population that choose the answer and the benchmark) was measured for each survey platform (including Consumer Surveys) using a seven question validation survey (see Table 2).

Raw results

We were only able to capture raw results and weighted results from the Google Consumer Surveys platform. Both panel results came back weighted, without the raw counts. In the media consumption based comparisons the raw results were less accurate than the weighted results (average absolute errors of 3.42% weighted vs. 3.88% raw). The raw results of health benchamarks were slightly more accurate, though not significantly more accurate (average absolute errors of 4.14% weighted vs. 4.08% raw)

Weighted results

After post-stratification of the Consumer Surveys results, accuracy for the media benchmark was best (average absolute error 3.42%), and slightly less accurate for the government health survey (average absolute error 4.14%). The probability sample Internet survey and the non-probability Internet survey were both marginally less accurate than the Consumer Surveys (4.70% and 5.87% respectively). As expected, post-stratification increased the average accuracy of the Consumer Surveys. The average absolute error for the non-Google samples was 5.29% across all benchmarks, while the Google samples averaged 3.82%.

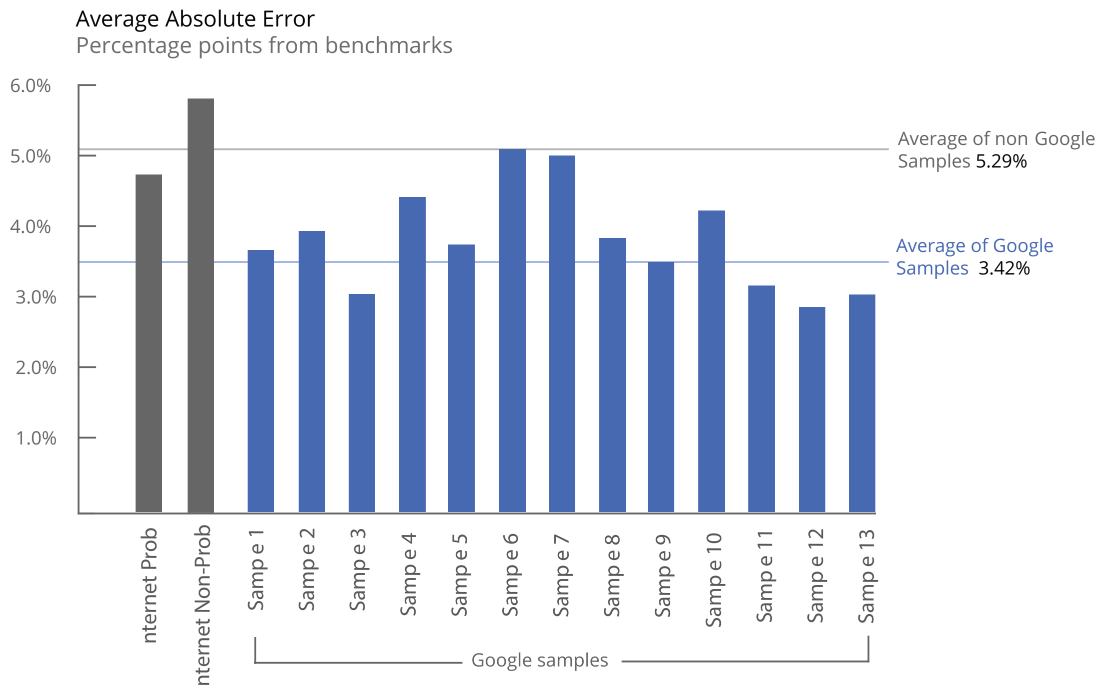

Figure 2. *Average absolute error over the 13 trials conducted on Consumer Surveys compared with single trials from the probability based and non-probability based Internet panels.*

Other accuracy metrics

Largest absolute error

The largest absolute error is another measure of accuracy, identifying the largest spread from the health and media benchmarks to each of the survey platforms. Measures without post-stratification weighting were less accurate based on this metric (11.70% for unweighted Consumer Surveys vs 8.40% for weighted) . After post-stratification both the probability based sample and the non-probability based survey had larger absolute error when compared to Consumer Surveys' 8.40% (vs 9.20% and 11.40% respectively). The average of the largest absolute error measures across all benchmarks was 10.3% for the non-Google samples while the Google samples average 7.46%.

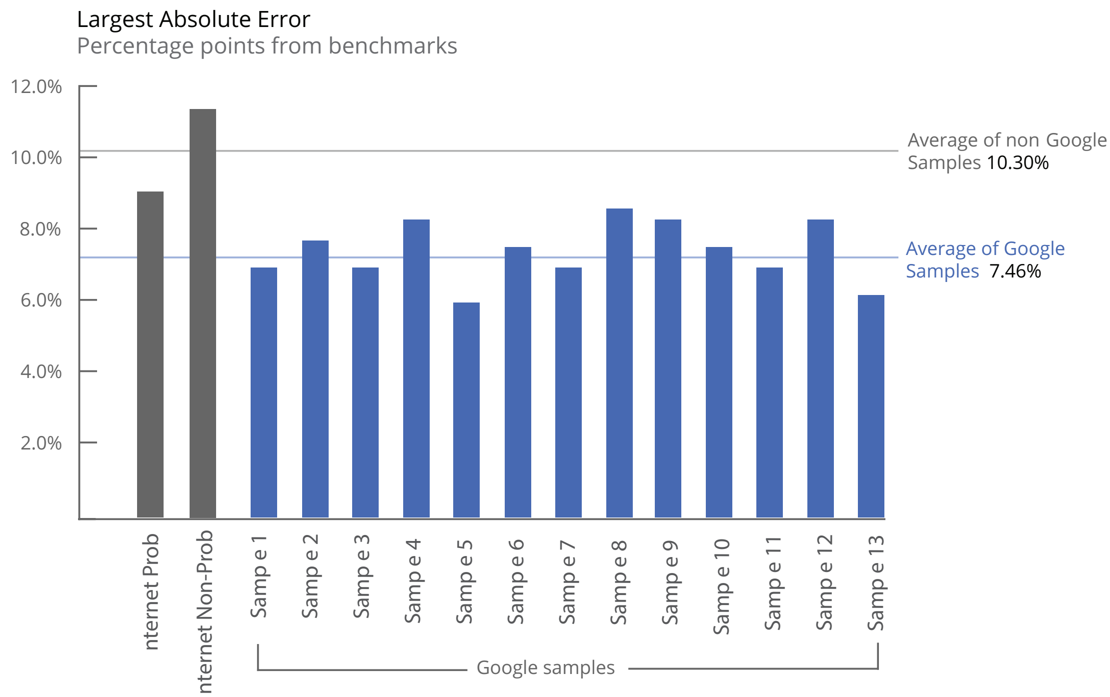

Figure 3. *Largest absolute error over the five trials conducted on Consumer Surveys compared with single trials from the probability based and non-probability based Internet panels.*

Percent of results within 3.5 percentage points

The final measure of accuracy used is percentage of measurements within 3.5 absolute percentage points of the benchmarks. Post-stratification weighted Consumer Surveys data averaged 49.45% of results within 3.5 percentage points while the unweighted Consumer Surveys data averaged 42.86% of results within 3.5 percentage points. Both the probability based sample and the non-probability based Internet survey had 33.33% of results within 3.5 percentage points.

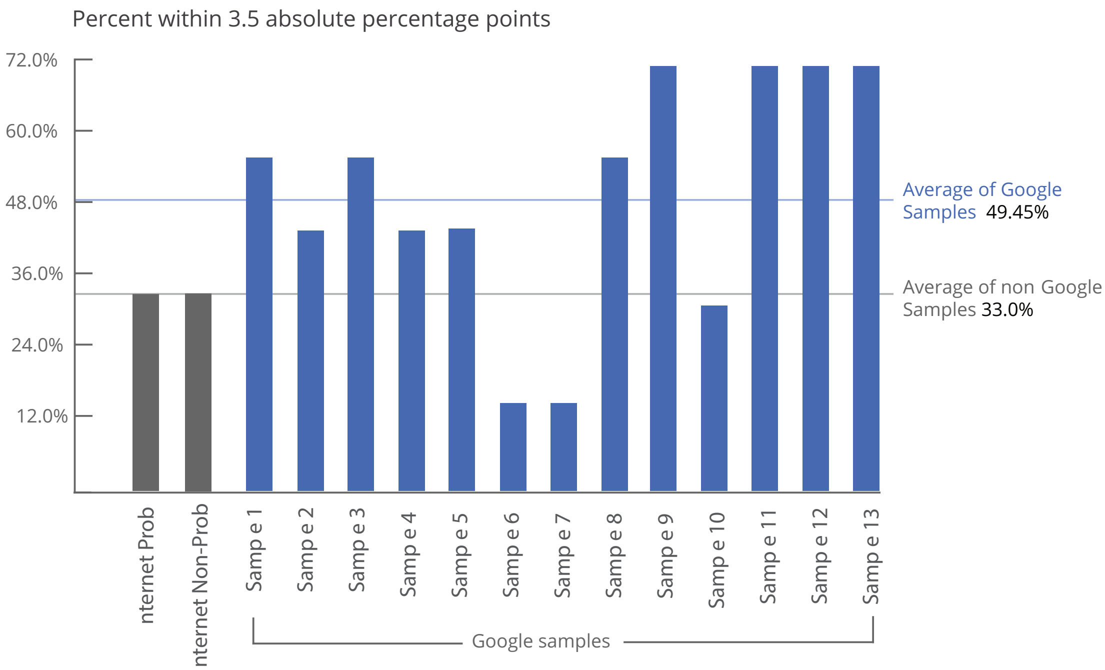

Figure 4. *Percent of responses within 3.5 absolute percentage points over the five trials conducted on Consumer Surveys compared with single trials from the probability based and non-probability based Internet panels.*

Section III: Conclusions and Limitations

Conclusions

Google Consumer Surveys provides both a new way to perform Internet surveys and a new method for publishers to monetize their content. Since Consumer Surveys run directly within publisher sites, the respondents may be more representative than respondents of more traditional internet surveys.

Response rates for Google Consumer Surveys are higher than telephone surveys and standard Internet panels, and are much higher compared to many Internet intercept surveys. This higher response rate is due, in part, to the short survey length of Consumer Surveys and the inferred demographic data.

Accuracy of Consumer Surveys is better than both the probability and non-probability based Internet panels on three separate measures: average absolute error (distance from the benchmark), largest absolute error, and percent of responses within 3.5 percentage points of the benchmarks. These results suggest that despite differences in survey methodology, Google Consumer Surveys can be used in place of more traditional Internet-based panels without sacrificing accuracy.

Limitations

Since Google Consumer Surveys only allows one-question or screening two-question surveys, analysis of the relationships between survey questions are difficult or sometimes not even possible. Bias can be introduced into surveys attempting to represent the U.S. population as Internet penetration in America is only 78% of adults. Internet users tend to be younger, more educated, and have higher incomes. Furthermore Google Consumer Surveys are served on our publisher network which, while large, does not fully encompass the breadth of Internet content available and therefore respondents can only be taken from a more limited sample. Our initial study focused on two types of benchmarks (media usage and health) derived from large population surveys. We believe that these benchmarks represent the U.S. population but their reach is limited in terms of the diversity of the subject matter. It's possible that Google Consumer Surveys has inherent bias in other areas and the researcher should be aware of those potential limitations. Finally, because of the way Consumer Surveys are presented to potential respondents (a format that protects premium content and prevents the user from reading the content) some types of questions may be regarded as too sensitive or suspicious. For example, asking a user about their bank account or credit card usage may appear as an advance from an untrustworthy advertiser or website. Consumer Surveys attempts to mitigate these issues by branding the survey as "powered by Google" and providing quick access to more information about how and why the data is collected, but some bias may exist for these types of questions.

Acknowledgements

The authors would like to thank the entire Consumer Surveys team for their effort in making this product, Art Owen[7] for his advice on statistical methods and for his feedback on this manuscript, Mike Murakami for his advice on survey methodology and for his feedback on this manuscript, and Adam Baker for his work on typesetting this manuscript.

Privacy

Privacy is very important to Google. Users always have the option to pass on a question and have the ability to opt-out of the DoubleClick cookie completely. IP location is approximate to the nearest city. The results of Google Consumer Surveys are only available to a survey researcher in aggregate form across many users and are never resold. For additional details, please see the Ads section of the Google Privacy Center (http://www.google.com/privacy/ads).

7 Art Owen is a professor of Statistics at Stanford University. His contributions to this project were as a consultant for Google and not part of his Stanford responsibilities.

References

Chang and Krosnick, 2009. National Surveys via RDD Telephone Interviewing Versus the Internet. Public Opinion Quarterly.
http://comm.stanford.edu/faculty/krosnick/docs/2009/2009_poq_chang_rdd.pdf

Gallup, 2012. Gallup Research Consulting
http://www.gallup.com/consulting/government/102403/research.aspx

Lavrakas, 2010. An Evaluation of Methods Used to Assess the Effectiveness of Advertising on the Internet.
http://www.iab.net/media/file/Evaluation_of_Internet_Ad_Effectiveness_Research_Methods.pdf

Pew Research Center's Internet & American Life Project, 2011. Demographics of Internet Users.
http://pewInternet.org/Static-Pages/Trend-Data/Whos-Online.aspx

Pew Research Center's Internet & American Life Project, 2011. Real time Charitable Giving (methodology).
http://www.pewInternet.org/Reports/2012/MobileGiving/Methodology/Methodology.aspx

Pew Research Center's Internet & American Life Project, 2012. Tablet and E-book reader Ownership Nearly Double Over the Holiday Gift-Giving Period (methodology).
http://www.pewInternet.org/Reports/2012/E-readers-and-tablets/Methodology/About-this-report.aspx

Pew Research Center's Internet & American Life Project, 2012. Teens, kindness and cruelty on social networks (methodology).
http://www.pewInternet.org/Reports/2011/Teens-and-social-media/Methodology/Survey.aspx

Yeager, Krosnick, Chang et al., 2009. Comparing the Accuracy of RDD Telephone Surveys and Internet Surveys Conducted with Probability and Non-Probability Samples.
http://comm.stanford.edu/faculty/krosnick/Mode%2004.pdf

Appendix: Data

Table 1. *Survey sample descriptions.*

Survey	Invitations†	Responses	PSRAI Response Rate	Cost	Time to results	Average Absolute Error	Field Dates	Probability Sample	Quota Used	Incentives Offered
Non-Google Surveys										
Internet Probability	1,995	1,165	2.6%	$8,100.00	8 days	4.70%	Jul 20–26, 2011	Y	N	Points; free Internet access; sweepstakes
Internet Non-probability	10,085	2,017	N/A	$6,900.00	23 days	5.87%	Aug 16–19, 2011	N	Y	Points; sweepstakes
Average	**6,040**	**1,591**	**0.026**	**$7,500.00**	**15.5 days**	**5.29%**				
Google Consumer Surveys										
Sample 1	7,712	1,916	25.23%	$1,340.90	1 day	3.56%	Nov 6–7, 2011	-	N	Access to online content
Sample 2	29,320	3,001	10.66%	$2,100.80	1 day	3.97%	Dec 14–15, 2011	-	N	Access to online content
Sample 3	40,763	3,010	7.78%	$2,106.90	1 day	3.09%	Jan 10–12, 2012	-	N	Access to online content
Sample 4	20,191	3,262	16.46%	$2,283.50	12 hours	4.49%	Jan 23, 2012	-	N	Access to online content
Sample 5	20,805	2,556	23.63%	$1,789.16	4 hours	3.71%	Jan 30, 2012	-	N	Access to online content
Sample 6	36,765	2,500	6.80%	$1750.00	1 day	5.24%	Feb 17, 2012	-	N	Access to online content
Sample 7	24,038	2,500	10.40%	$1,750.00	1 day	5.04%	Mar 19, 2012	-	N	Access to online content
Sample 8	5,190	1,500	28.90%	$1,500.00	1 day	3.86%	May 17, 2012	-	N	Access to online content
Sample 9	5,792	1,500	25.90%	$1,500.00	1 day	4.43%	May30, 2012	-	N	Access to online content
Sample 10	6,017	1,500	24.93%	$1,500.00	1 day	4.37%	Jun 12, 2012	-	N	Access to online content
Sample 11	3,348	1,500	44.80%	$1,500.00	1 day	3.11%	Jun 26, 2012	-	N	Access to online content
Sample 12	3,304	1,500	45.40%	$1,500.00	1 day	2.76%	Jul 11, 2012	-	N	Access to online content
Sample 13	7,036	1,500	21.32%	$1,500.00	1 day	3.01%	Jul 25, 2012	-	N	Access to online content
Average	**16,175**	**2,134**	**22.48%**	**$1,493.94**	**1 day**	**3.76%**				

† For Consumer Surveys samples, an impression of the survey is equivalent to an invitation.

Table 2. *Benchmark measurements.*

Type	Question	Yes	No	Source
Media	Does your household have a satellite dish?	28.7%	71.3%	Scarbough RDD telephone Poll (Scarbough 1H 2011, 208,274 respondents)
Media	Have you watched any programs or events on Video-On-Demand in the past 12 months?	20.6%	79.4%	Scarbough RDD telephone Poll (Scarbough 1H 2011, 208,274 respondents)
Media	Does your household own or use a digital video recorder (DVR)?	43.1%	56.9%	Scarbough RDD telephone Poll (Scarbough 1H 2011, 208,274 respondents)
Health	Have you smoked 100 or more cigarettes in your lifetime and now smoke every day or occasionally?	20.6%	79.4%	http://www.cdc.gov/tobacco/data_statistics/fact_sheets/adult_data/cig_smoking/index.htm#national
Health	Have you been diagnosed with asthma at any point in your lifetime?	13.8%	86.2%	http://apps.nccd.cdc.gov/brfss/list.asp?cat=AS&yr=2010&qkey=4417&state=All
Health	In the past year have you been in a car accident while driving that involved property damage, an injury or fatality?	4.0%	96.0%	http://www.distraction.gov/research/PDF-Files/Distracted-Driving-2009.pdf
Health	Because of a physical or mental health condition do you have difficulty with daily life activities, walking, or working around the house or at a job?	20.8%	79.2%	http://apps.nccd.cdc.gov/brfss/list.asp?cat=DL&yr=2010&qkey=4000&state=All

Table 3. *Overall accuracy metrics.*

	Non-Google Surveys			Google Consumer Surveys					
Evaluative Criteria	Internet Probability	Internet Non-probability	Average	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5	Sample 6
Average absolute error									
Media Benchmarks	4.70%	5.87%	5.29%	3.40%	4.73%	1.77%	3.27%	3.07%	3.50%
Without Post-Stratification	-	-	-	5.67%	5.07%	3.10%	4.97%	4.50%	3.87%
Health Benchmarks	-	-	-	3.68%	3.40%	4.08%	5.63%	4.20%	6.55%
Without Post-Stratification	-	-	-	5.20%	4.03%	3.95%	4.80%	4.60%	5.28%
Combined Average Absolute Error	4.70%	5.87%	5.29%	3.56%	3.97%	3.09%	4.49%	3.71%	5.24%
Without Post-Stratification	-	-	-	5.40%	4.47%	3.59%	4.89%	3.99%	4.67%
Largest absolute error									
All	9.20%	11.40%	10.30%	7.00%	7.70%	7.00%	8.40%	5.90%	7.60%
Without Post-Stratification	-	-	-	11.70%	10.30%	7.20%	7.40%	8.00%	6.50%
% of answers with 3.5 pp of benchmarks									
All	33.30%	33.30%	33.30%	57.14%	42.86%	57.14%	42.86%	42.86%	14.29%
All *Without Post-Stratification*	-	-	-	14.29%	42.86%	42.86%	28.57%	42.86%	28.57%

Evaluative Criteria	Sample 7	Sample 8	Sample 9	Sample 10	Sample 11	Sample 12	Sample 13	Average
	Google Consumer Surveys (continued)							
Average absolute error								
Media Benchmarks	6.03%	3.70%	2.73%	6.03%	1.63%	2.37%	2.23%	3.42%
Without Post-Stratification	4.47%	4.23%	3.70%	4.73%	2.00%	2.13%	2.03%	3.88%
Health Benchmarks	4.28%	3.98%	3.95%	3.13%	4.23%	3.05%	3.60%	4.14%
Without Post-Stratification	4.43%	4.65%	3.13%	3.33%	3.78%	3.15%	2.70%	4.08%
Combined Average Absolute Error	5.03%	3.86%	3.43%	4.37%	3.11%	2.76%	3.01%	3.82%
Without Post-Stratification	4.44%	4.47%	3.37%	3.93%	3.01%	2.71%	2.41%	3.95%
Largest absolute error								
All	7.00%	8.70%	8.20%	7.90%	7.20%	8.20%	6.20%	7.46%
Without Post-Stratification	7.40%	9.60%	5.70%	6.90%	7.70%	6.80%	5.90%	7.78%
% of answers with 3.5 pp of benchmarks								
All	14.29%	57.14%	71.43%	28.57%	71.43%	71.43%	71.43%	49.45%
All *Without Post-Stratification*	28.57%	42.86%	42.86%	42.86%	71.43%	57.14%	71.43%	42.86%

Statement of Grigory Raykhtsaum Regarding Mechanical Applications of Precious Metals on Jewelry Products
June 4, 2013

I, Grigory Raykhtsaum, am Director of Metallurgy at Leach Garner, a company that specializes in gold, silver, gold-filled applications,[1] and alloys, as well as the production of precious metal beads, findings [2] and chains for use in the jewelry industry. Our specialties include mechanical applications of precious metals on jewelry products.

Professional Background

I have been employed as Director of Metallurgy at Leach Garner since May of 2012. I was earlier employed by Stern-Leach (Leach & Garner), now part of Leach Garner, between 1984 and 2008, as a Senior Technologist and Senior Metallurgist. During that period I was engaged in research and development for new products, and managed the Materials Characterization and Assaying laboratories for the Company. Among my responsibilities was the design of corrosion and tarnish tests for precious metal alloys and coatings, as well as the development of standard methods for mechanical testing of finished jewelry. From 2008 to 2012, I was Vice President, Technology and Research and Development, at Sigmund Cohn Corporation in Mt. Vernon, New York, where I specialized in the manufacture of products composed of platinum group metals.

I hold an MS degree in Physics from the Polytechnic Institute in St. Petersburg, Russia. I have also completed all the courses required for a PhD degree in Materials Science at the Technological Institute at Northwestern University in Evanston, IL. I am a member of the Materials Information Society (ASM), the International Precious Metals Institute (IPMI) and ASTM, formerly known as the American Society for Testing and Materials.

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[1] "Gold-filled" is an accepted industry term for a product that consists of silver with a surface-layer application of gold or gold alloy, the gold constituting at least 1/20 the weight of the metal in the entire article. The term is addressed in the current version of the *FTC Guides for the Jewelry, Precious Metals and Pewter Industries* at §23.4(c)(3).

[2] "Findings" are the small parts used to join jewelry components together to form a completed article.

This statement is based on testing I performed, described in Exhibit 5, as well as on my education and professional experience in the field of metallurgy and metal-application processes.

Test Results: Mechanical Applications of Precious Metals and Durability

In an earlier statement, dated September 25, 2012, I stated that we could not assure durability to our customers if a surface layer of precious metal was not at least 1/40 of the weight of the metal in the entire article.[3] Since then I have had the opportunity to perform wear tests on several samples containing applications of precious metals. The samples, test method and results are described in full in my report of May 25, 2013, attached to this submission as Exhibit 5. The results are summarized here.

Mechanical Applications of Gold or Gold Alloy

The durability of a mechanical application of gold alloy is not assured if the thickness of the application falls below 170 µin (4.32 µ).[4] The basis for this conclusion is evident in Table 3 of my report (*Measured thickness values of electro-plated and clad layers vs. time*) and Figure 14 (*14K Thickness Removed vs Time*). Those charts indicate that after 8.5 hours of wear testing, an application of mechanically applied 14K gold diminishes by 170 µin (4.32 µ).[5] It is our experience at Leach Garner that 8.5 hours of wear testing equates to prolonged actual wear by a consumer, with excessive – even harsh – handling.

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[3] My statement of September 25, 2012 is included in the Association Response of September 27, 2012 ("Association Response") as Exhibit 8.

[4] I refer here to gold alloy, the material used in mechanical applications. Fine gold is not practical in mechanical applications because it is too soft.

[5] Table 3 indicates that the sample containing an application of 10K gold performed better, losing only 96 µin (2.4 µ) of the surface layer. This sample, however, was produced from gold alloy that was "hard as rolled" and not annealed. See page 2 of my report, Exhibit 5. Annealed material is much more commonly used in mechanical applications because it is softer and capable of being formed into jewelry. Thus, the results concerning the sample with the application of 10K gold are interesting, but not relevant to my conclusion as to when a durability disclosure is advised.

The loss of 170 µin (4.32 µ) from the surface layer is significant: If the metal that underlies a mechanical application is .006 inches thick, which is common, and if the gold alloy is 1/40th of the weight of the metal in the entire article, also common, the thickness of the application will be approximately 170 µin (4.32 µ). To protect consumers, including those that expose jewelry products to the sort of prolonged and continuous wear described above, I believe that 170 µin (4.32 µ) is the appropriate minimum thickness for mechanical applications of gold, below which a disclosure about durability would be advised.[6]

Mechanical Applications of Sterling Silver

As is evident in Table 3 of my report, the thickness of an application of sterling silver was reduced by approximately 250 µin (6.35 µ) when subjected to our wear test for 8.5 hours. Given this result, I recommend that if a product contains a surface layer of sterling silver that is less than 250 µin (6.35 µ), consumers be advised that durability is not assured.

Mechanical Applications of Platinum Group Metals

Currently, manufacturers cannot easily use mechanical processes to create surface-layer applications of platinum group metals. Nonetheless, should the industry develop the technology, there would likely be a strong market for the products, as these metals are desirable.[7]   While I did not have the opportunity to test samples with surface layer applications of platinum or palladium, it is my experience that both metals exhibit a wear

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[6] Note that the minimum recommended in the Association Response for products with electrolytic applications of gold is 7 µin (.175 µ), a coating that is significantly thinner than that recommended here for mechanical applications. This is because the elements used in electrolytic platings of gold or gold alloy increase the hardness of the surface layer, making it very resistant to wear. The mechanical process, which relies on heat and pressure to cause the surface layer to adhere to the underlying metal, does not increase the hardness of the gold alloy in the surface layer.

[7] Rhodium and ruthenium are not likely candidates for use in mechanical applications as both are particularly difficult to work with in that context.

resistance that is very similar to gold alloy. For that reason I recommend that the minimum be the same as that recommended for 14K gold: 170 µin (4.32 µ). Below that thickness, it should be disclosed that the durability of the surface layer is not assured.

Thank you for the opportunity to share my expertise with the Commission.

_______________________ June 4, 2013________

Grigory Raykhtsaum Date

Director of Metallurgy

Leach Garner

49 Pearl Street, Attleboro, MA 02703

LEACH GARNER
A Berkshire Hathaway Company

Report 8089

Date: May 25, 2013
To: Suzan Flamm, Mark Hanna, Brian Clapprood.
cc: Michael Akkaoui
From: Greg Raykhtsaum and Jeff Stewart.
Subject: Wear behavior of electro-plate vs. clad.

Introduction.
Around the same time frame, more than two centuries ago, both gold electro-plate and gold-filled clad were first used for making jewelry. Those were two different techniques each showing different features and serving different purposes. Even today, in spite of the advances in technology, these differences clearly remain fundamental as listed in the Table 1 below.

Table 1. Features of gold-filled clad vs. electro-plate.

Gold-Filled Clad	Electro-Plate
Gold-filled clad material is designed to maintain certain precious metal content (certain weight fraction of karat gold). The precious metal content is independent of size and shape of the jewelry article.	The precious metal content of electro-plated jewelry is practically negligible; It also varies with the surface area and the overall volume.
Gold-filled clad is made with a wide variety of common karat gold jewelry alloys of different colors.	Electro-plate is mainly used to plate single elements such as gold, silver rhodium, etc., as well as some limited alloys the composition of which differs significantly from that of common jewelry alloys.
Karat gold alloy is mechanically affixed to the base metal substrate (usually brass). The bond is strong so that the jewelry article may be formed using gold-filled material. Therefore, gold-filled clad is a workable manufacturing material.	The forming operations are not practical for electro-plated material as the bond is not as strong and the plated layer may flake or peel off. The plating is always carried out as a final operation on the finished article as a decorative or protective coating.
Gold-filled clad does not require the presence of interliner between base metal substrate and gold alloy.	Electro-plate requires the presence of the interliner, such as a pre-plated layer of nickel or palladium, or both, to condition the surface of the substrate.
The jewelry article that is made with the gold-filled material appears and feels as an article made with the solid jewelry alloy.	The plating has a distinct specific appearance that differs from that of solid karat gold jewelry.
The thickness of the clad is significant and unlimited, normally around 600 mills (10^{-6} inches) and higher.	Electro-plate thickness is relatively small as it has certain limitations related to porosity. For example, the industry accepted thickness limits for some elements are shown below in mills (10^{-6} inches). Rhodium: 5- 10 mills Palladium: 10 – 20 mills Gold: 100- 150 mills Silver: about 200 mills

Moreover, there is a distinct difference between gold-filled clad and electro-plate in the response to wear. This brings us to the objective of this work.

Objective.
The objective of this work is to illustrate the comparative wear behavior of gold-filled clad and electro-plate. This is achieved by subjecting an assortment of gold-filled, rolled-gold-plate and electro-plated samples simultaneously to the abrasive media and by measuring the top layer thickness loss versus time.

Sample preparation.
Annealed brass discs 0.020" thick and 1.5" OD were supplied to Tanury Industries in Lincoln, RI for electro-plating with four precious metals: rhodium (Rh), palladium (Pd), gold (Au) and silver (Ag). The discs were pre-plated with the interliner containing either nickel or palladium or both.

The same OD discs with approximately the same thickness were cut out from the sheet strips of 10K/20 and 14K/20 gold-filled material, double-sided 14K/40x14K/40 rolled-gold-plate, and 1/10 sterling silver clad on brass. 14K and sterling sheet strips were annealed (soft condition), whereas 10K/20 material was selected in hard as rolled condition to see the potential effect of hardness on wear resistance. The Vickers hardness at 50 gram load was measured for all the samples. Table 2 lists the sample description and measured hardness values. This is not unusual that the hardness of the electro-plated pure metals exceeds that of the same pure metals in the annealed condition. Naturally, the hardness values of karat gold and sterling silver clads are in line with the corresponding values for the solid alloys.

Table 2. Sample description and hardness.

Sample	Vickers Hardness
Rhodium electro-plate 5 mills nominal	255
Palladium electro-plate 10 mills nominal	150
Gold electro-plate 50 mills nominal	170
Silver electro-plate 200 mills nominal	140
1/10 sterling silver clad	75
10K/20 gold-filled	220
14K/20 gold-filled	110
14K/40x14K/40 rolled-gold-plate	110

Experimental procedure, results and discussion.
The wear test was conducted using Otec mass finishing equipment shown in Figure 1. The disc samples were placed inside the bowl filled with walnut shells mixed with moderately abrasive paste. The spinning of such an abrasive media in the bowl (as shown in Figure 2) provided the slow and graduate removal of the sample disc top surface layers with time.

Figure 1. Mass finishing equipment.

Figure 2. Spinning walnut shells.

The thicknesses of the clad and the electro-plated layers were measured prior to the test, and then after 2.5, 8.5 and 26.5 hours. The thickness measurements were performed on the cross sectioned parts of each disc sample using Scanning

Electron Microscope (SEM) Jeol 6010. Table 3 lists the measured sample thicknesses as a function of the wear test time. As an illustration of differences between electro-plate and clad, Figures 3 and 4, 5 and 6, and 7 and 8 respectively show the SEM micrographs of the gold and silver electro-pated layers, and14K/40 layer after 8.5 and 26.5 hrs. of test. The original magnification is 1000X for all the photographs, and the scale bar is 10 microns (approximately 400 mills).

Table 3. Measured thickness values of electro-plated and clad layers vs. time.

Time (hrs.)	Measured thickness (mills)							
	Rh	Pd	Au	Ag	1/10 sterling silver	10K/20	14K/20	14K/40
0	7	17	68	176	1686	603	860	586
2.5	5	12	54	154	1560	546	737	474
8.5	0	10	39	105	1439	507	690	410
26.5	0	0	16	38	1170	456	563	273

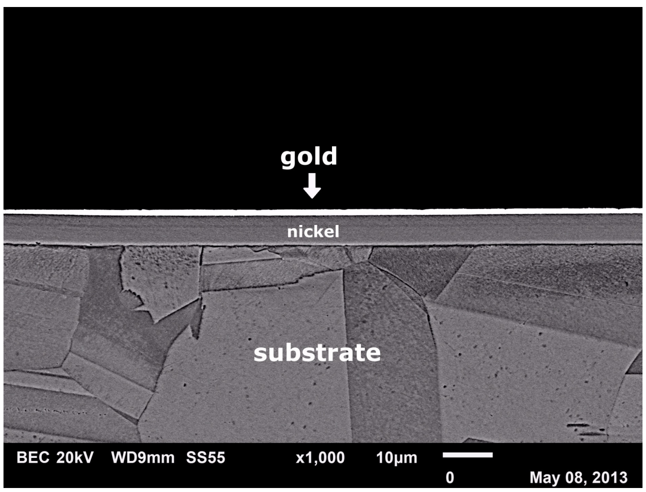


Figure 3. Au electro-plate after 8.5 hrs.

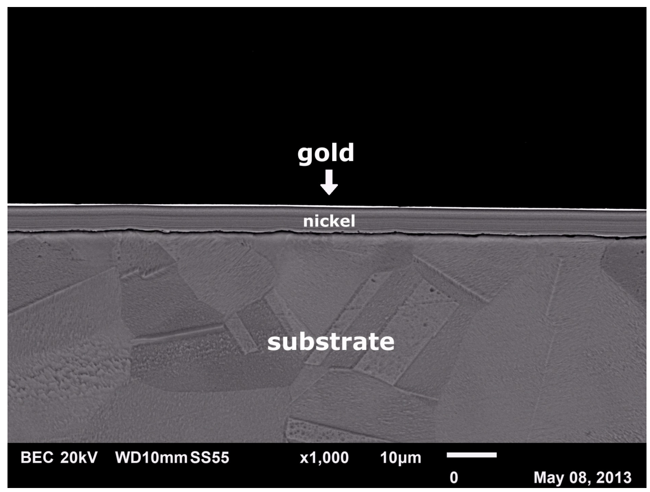


Figure 4. Au electro-plate after 26.5 hrs.

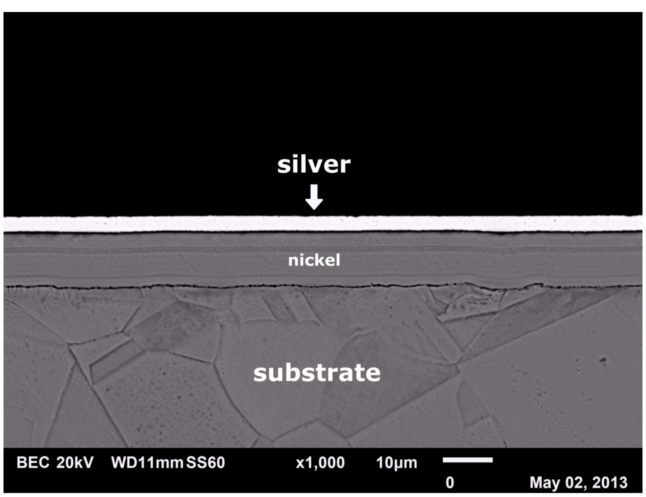


Figure 5. Ag electro-plate after 8.5 hrs.

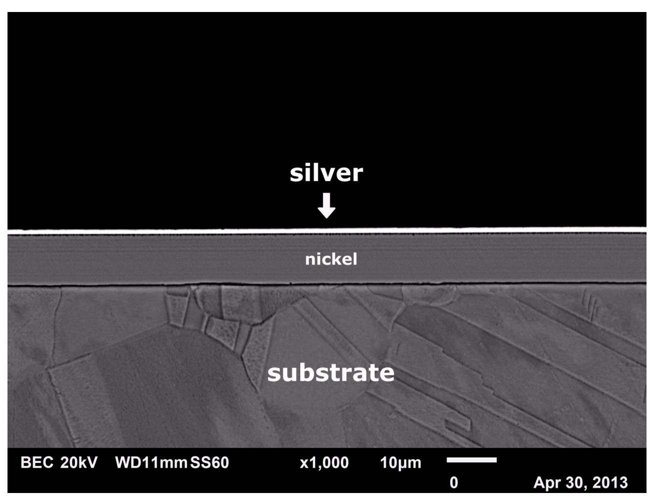


Figure 6. Ag electro-plate after 26.5 hrs.

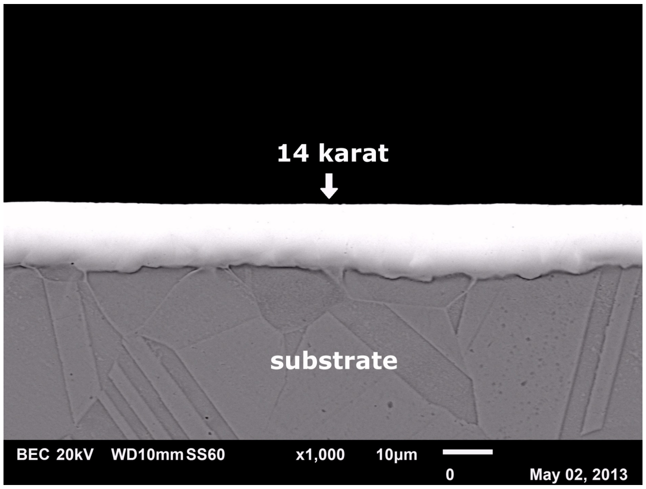


Figure 7. 14K/40 rolled-gold plate after 8.5 hrs.

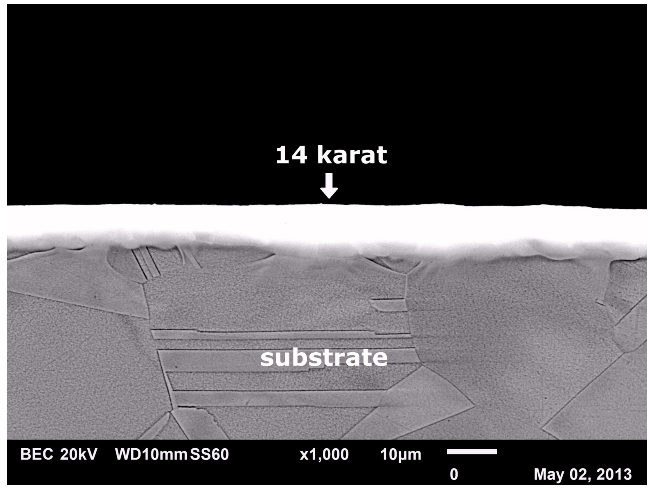


Figure 8. 14K/40 rolled-gold plate after 26.5 hrs.

Along with the thickness measurements the X-ray spectrum of the surface of each disc sample was also collected to confirm the presence and the integrity of top layers. As an example, Figures 9, 10 and 11 respectively show the X-ray spectra of the original surface of the rhodium-plated disc, the same surface after 2.5 and after 8.5 hours of test. The original surface shows only rhodium peak. The same surface after 2.5 hours also shows palladium peak that belongs to the pre-plated interliner – this is an indication that the significant portion of rhodium layer has been removed. The surface after 8.5 hours shows no rhodium and only palladium peak – this is an indication that the entire rhodium layer has been removed.

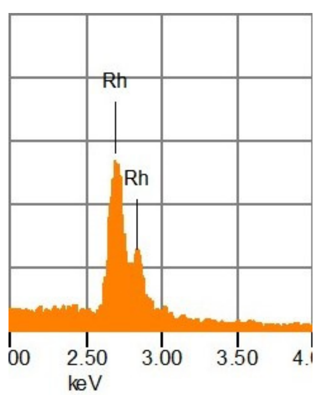


Figure 9. X-ray spectrum of original rhodium-plate surface.

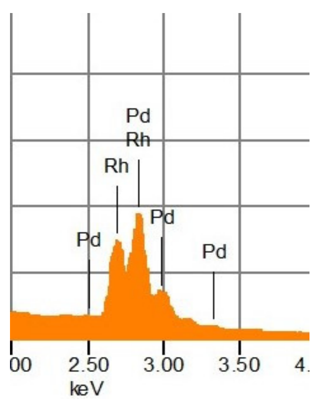


Figure 10. X-ray spectrum of rhodium-plate surface after 2.5 hours.

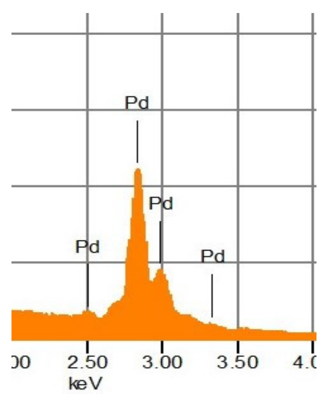


Figure11. X-ray spectrum of rhodium-plate after 8.5 hours.

The data in Table 3 shows that within first 2.5 hours of test the regular 14K layer loses about 120 mills of its thickness. This amounts to about 25 milligrams of material per square inch area. ***This is a noticeable loss, as it can be measured by a conventional instrument such as a micrometer or a two-decimal place scale. Such a loss of 14K material corresponds to a prolonged exposure to normal wear and handling.***

This data also shows that within 2.5 hours (or under the prolonged exposure to normal wear and handling) rhodium loses 2 mills and palladium losses 5 mills. With some safety factor for rhodium (as 2 mills is an extremely low thickness) one may conclude that at least 3 mills for rhodium and 5 mills for palladium are reasonable minimum limits.

Our gold data indicates that under the same conditions the gold loss is about 14 mills. It is not unreasonable to conclude, therefore, that at least 15 mills should be a minimum thickness to withstand prolonged normal wear and handling. It is not unusual, however, for the industry current practice to electro-plate 7 mills of gold.

According to our data the silver minimum limit may be reduced to 50 mills (instead of 100 mills) with a good safety factor.

Data presented in Table 3 is plotted in two different diagrams shown in Figures 12 and 13 separately for electro-plates and clads. It is evident that under the same conditions even though the rhodium electro-plate shows the highest hardness, it wears off between 2.5 and 8.5 hours of test because of an extremely low thickness. Palladium wears off between 8.5 and 26.5hours. By the time when both rhodium and palladium are completely removed gold and silver still retain about 20% of the original thickness. At the same time, clad samples including gold-rolled-plate retain between 50%-70% of their original thickness. The extrapolation of these plots indicates that a complete wear of electro-plated gold and silver should take place in about 35 hours (about 9 additional hours) while clads may still retain a significant portion of the original thickness. Also, as anticipated, hard as rolled gold-filled material shows higher resistance to wear as opposed to annealed material.

Figure 12. Plating Thickness vs. Time.

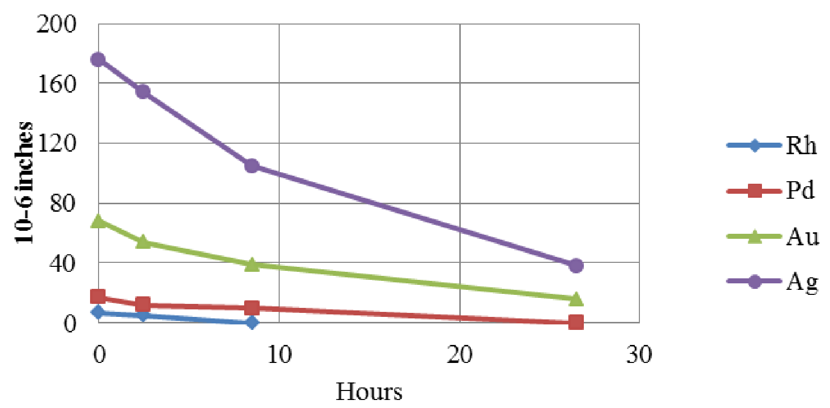
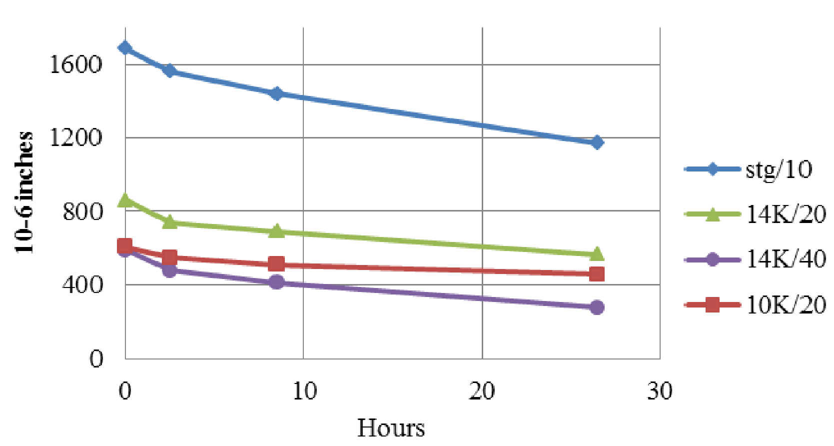
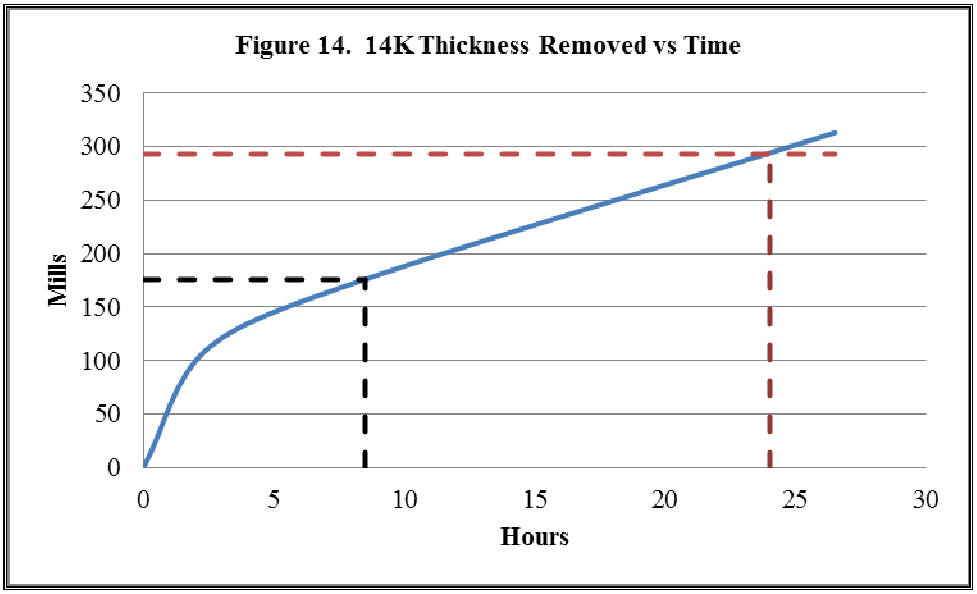


Figure 13. Clad Thickness vs. Time



1/10 sterling silver clad, 1/20 gold-filled and 1/40 rolled-gold-plate appear to exhibit reliable wear characteristics (durability) even at the total material thickness below 0.020". For instance, 0.010" thick 14K/40 material has about 293 mills of 14K layer, and 0.006" thick material (which is the smallest practical size) has about 176 mills of 14K layer. Figure 14 shows the 14K gold layer thickness loss vs. time. It is evident that both 0.010 and 0.006 thick 14K/40 withstand 24 hrs. and 8 hrs. of wear test respectively – this is this way within the conditions of normal prolonged wear and handling. The materials with the lower than 1/40 fractions of 14K , such as 1/60 and 1/80 may not show as high durability under similar conditions especially when the total material thickness is below than 0.020".



Conclusions.

1. In general, the electro-plates and clads are fundamentally different matters. Electro-plates serve as decorative or protective coatings that are applied to a finished jewelry at the final stage of manufacturing. The clads on other hand, are workable and formable jewelry materials.

2. The wear behavior of electro-plates is significantly inferior to that of gold-filled, rolled-gold-plate and sterling silver clads mainly due to inherently low thickness limitations of electro-plates.

3. Our data supports the justification for the following minimum thickness limits of electro-plates:

- 3 mills for rhodium,
- 5 mills for palladium,
- 15 mills for gold,
- 50 mills for silver.

4. Our results show that 1/10 sterling silver clad, 1/20 gold-filled and 1/40 rolled-gold-plate withstand normal prolonged wear and handling.

5. The clad materials with lower than 1/40 fractions of gold alloy layer may not show adequate wear characteristics.

Statement of Michael A. Akkaoui Regarding Electrolytic Applications of Precious Metals on Jewelry Products
June 4, 2013

I, Michael A. Akkaoui, am the President and CEO of Tanury Industries, a company that specializes in metal finishing and surface-layer applications of metals. Our specialties include electrolytic applications of precious metals on jewelry products.

Professional Background

Tanury Industries has been in business since 1946. The services we provide include surface-layer applications of gold, silver, platinum, rhodium, palladium and ruthenium. Our staff includes several chemists and engineers with doctorates in materials.

My recommendations are based on my professional experience in the field of metallurgy and metal-application processes, particularly electrolytic applications of precious metals on jewelry products. I hold a Juris Doctorate degree from the New England School of Law and a Bachelor of Arts degree from Providence College. I joined Tanury Industries in 1974, became its president in 1990, and Chief Executive Officer in 1995.

I serve on the Board of Directors of Manufacturing Jewelers and Suppliers of America (MJSA) and am a member of the American Electroplaters and Surface Finishers Society, the Providence Jewelers Club, and Rhode Island Contract Electroplaters. I am a certified International Organization for Standardization (ISO) lead auditor.

I have been a featured speaker on topics relating to electrolytically applied surface-layer applications of precious metals for MJSA and the American Electroplaters and Surface Finishers Society.

Recommended Karat Fineness for Electrolytic Applications of Gold

The Federal Trade Commission's *Guides for the Jewelry, Precious Metals and Pewter Industries* ("*Guides")* advise a minimum quality standard of 10 karats for electrolytic applications of gold. The recommendation appears in three sections, 23.4 (c) (2) and (4) and 23.5[1] and is linked to the thickness of the application. For example, §23.4 (c) (4), which addresses gold electroplate, states that a product with an electrolytic plating of gold or gold alloy "of not less than 10 karat fineness, which has a minimum thickness throughout equivalent to .175 microns…of fine gold" may be described as gold electroplate.

I believe that the minimum of 10 karats for electrolytic platings, the standard contained in these sections, is too low to produce consistent products. There are significant issues of plating quality with low karat plating baths. It is also difficult to maintain the bath chemistries to a consistent karat purity when the plating quality is at a low karat level. Post-plating, some low karat finishes will tarnish due to the high silver alloy content in the deposit. The problem is not solved by increasing the thickness of the application to the point where it is the equivalent of .175 microns of fine gold (or 2.5 microns in the case of heavy gold electroplate or vermeil, or .5 microns in the case of gold plate [2]). There will be a thicker application, but there is the identical risk of tarnish, and consumers will be disappointed.

A purity specification of a 22 karat minimum is necessary to prevent tarnish and produce a durable electrolytic application of gold. Therefore, I recommend that instead of "fine gold," the minimum should be stated as 22 karats. Moreover, for the reasons stated, I do not recommend the use of a lower karat gold alloy in any circumstance, even if the thickness of the application is equivalent to .175 microns (or 2.5 or .5, depending on the product) of fine gold.

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[1] Section 23.5, concerns "vermeil." While the section does not specify the method used to affix the surface layer, the term "vermeil" is widely understood in the industry to apply only to electrolytic applications and so I include §23.5 in this discussion.

[2] Sections 23.4(c)(4), 23.5 and 23.4(c)(2), respectively.

Test Results: Electrolytic Applications of Precious Metals and Durability

In an earlier submission I stated that, based on my over 38 years of experience in the field, reasonable durability for electrolytic applications of a variety of precious metals is achieved at the following thicknesses:[3]

> Gold: at least 7 millionths of an inch (approximately .175 microns)
> Platinum: at least 5 millionths of an inch (approximately .127 microns)
> Silver: at least 100 millionths of an inch (approximately 2.54 microns)
> Palladium: at least 5 millionths of an inch (approximately .127 microns)
> Rhodium: at least 3 millionths of an inch (approximately .076 microns)
> Ruthenium: at least 5 millionths of an inch (approximately .127 microns)

I have now had an opportunity to review the results of testing completed by my company, Tanury Industries, as well as by Taber Industries, attached to this submission as Exhibits 7 and 8 respectively. My analysis of these test results is included in my report, Exhibit 7, at pages 3-4. For the reasons expressed there, if products contain electrolytic applications of precious metals that are below the minimum thicknesses recommended above, consumers should be advised that durability is not assured.

Thank you for the opportunity to share my expertise with the Commission.

June 4, 2013

______________________________ ______________________________

Michael A. Akkaoui — Date
President and CEO

Tanury Industries
6 New England Way
Lincoln, RI 02865

[3] My statement of September 25, 2012 is included in the Associations' submission of September 27, 2012.

TANURY INDUSTRIES

ELECTROPLATING * COATING * SPUTTERING

To: Jewelers Vigilance Committee
From: Michael A. Akkaoui, Tanury Industries
Subject: Testing Report Analysis
June 2, 2013

Final: 6/3/2013

The following report can be used to summarize both the testing completed by Taber dated May 24, 2013 on plating samples prepared by Tanury Industries according to Exhibit 7 to this submission and testing performed by Tanury Industries on a duplicate set of samples prepared on the same rack and the same time as the Taber samples. The Tanury Industries test is a vibe wear test and the Taber test is a linear wear test. The data from both tests should provide three important goals:

1. What is the relative wear difference between plating that is set at the recommended FTC levels and plating that is considered low thickness flash plating; (Taber Testing)

2. What is the expected life in the field between the recommended FTC levels and low thickness flash plating?

3. What is the correlation between the two tests and what does the testing conclude when taken together.

Note: Wear testing in a vibe and linear testing results, on duplicate specimens; have never been correlated in both our experience and Mr. Cliff Fee's (Taber) experience. We feel this added step will provide better wear analysis and wear expectations.

Part 1: Taber Test Analysis:
Mr. Cliff Fee's report dated May 24, 2013 sets out in detail the testing procedure. I will therefore not reiterate the process here. However, there was some collaboration between Tanury Industries and Taber regarding the type of wear rate and weight suggested to insure that wear rates at lower film thicknesses could be evaluated and compared properly to the heavier thicknesses. The results are summarized on my May 6th matrix provided to Taber. In general, the results came in as expected. The lower film thicknesses wore at about half the cycles as the heaver thicknesses. All of the white precious metals wore at about the same rate (platinum, rhodium and ruthenium). Silver and palladium wore quicker and this was expected due to the nature of the material. <u>Therefore, for all of the white metals supplied for testing, one could conclude quite easily that the heavier the deposit the better the wear almost on a linear basis. (See data cycles to failure in the last column of the May 6th matrix).</u> Gold was somewhat less linear in its wear characteristics. Unlike the white precious metals, two different gold plating chemistries were used to build the two different thicknesses defined for the test. The lower film thickness used cyanide gold and the heavier gold thickness used cobalt hardened acid gold both at a purity greater than 22KT. This may account for the non linear wear pattern. The other factor is the error factor of the test itself....the flash gold being so thin that the observation of wear could have been too quick at 500 cycles. <u>As</u>

you can see from the matrix, the gold test (specification 2) wore the quickest of all samples tested. This result was also expected given the softness and thinness of the deposit.

Part 2: Tanury Vibe Wear Testing:

Given all of the years that we have been performing vibe wear testing, we have concluded that for every 1/2 hour of successful wear in the vibe test. This would correlate to 1 year of wear in the field of normal use. Normal use is defined as periodic use under wear conditions that are not subjecting the item to sever abuse. Examples of abuse of a plated item could be defined as subjecting the item to harsh chemicals, sanding or scraping, steel wool, dropping repeatedly, swimming daily or cleaning with soap daily. Normal use can also be defined as four touches per day by hand every day the item is worn. To simulate or better define the touch method, if we take the Taber result on 7 microinches of gold, the result was 1200 cycles.....at 2 touches per day; this would be approximately 2 years of continuous use. Our vibe data would correlate historically to this result.

Method of Testing: The coupons were prepared with the Taber samples, read on an x-ray and then subjected to the vibe test. Samples were placed in the vibe with a specific media and soap. The parts were sampled every 15 minutes for signs of wear and the results documented by Tanury Industries lab personnel.

Vibe Data Results

Specification	**Wear Data**	**Field Wear Est.**	**Specification**	**Wear Data**	**Field Wear Est.**		**Notes**
7 um Gold	**1.5 hours**	**1.5 years**	**2 um Gold**	**Less than .5 hours**	**Less than 6 months**		
5 um Platinum	**13 hours**	**13 years**	**2 um Platinum**	**6 hours**	**6 years**		
100 um Ag	**70 hours**	**See Note**	**40 um Ag**	**28 hours**	**See Note**		**Silver thickness alone will not tell the wear story…silvers oxidation rate will increase the wear rate. This test will not simulate this factor.**
5 um Palladium	**4 hours**	**4 years**	**2 um Palladium**	**1.5 hours**	**Less than 2 years**		
3 um Rhodium	**10.5 hours**	**Over 10 years**	**1 um Rhodium**	**3.5 hours**	**Less than4 years**		
5 um Ruthenium	**6.5 hours**	**Over 6 years**	**2 um Ruthenium**	**2.5 hours**	**Over 2 years**		

Conclusion of Results:

The wear rate on the gold was expected given the historical data we have on the vibe test. The correlation of 1 hour of vibe time to I year in the field is a good assumption given the historical data. The white precious metals actually did better in our testing than predicted. However, the field wear rates at 1 hour in the vibe to 1 year in the field may not be as accurate as with gold. My experience would tell me that the wear rate could be 2 hours of wear in the vibe equals 1 year in the field. This would cut the field wear in the matrix in half on the white precious metals. Overall, the Taber data and the vibe test had good correlation as far as wear rates. The next section will set that out.

Part 3: Correlation of the Two Test Methods: Ran

Specification Rank	Rate of Wear Taber	Specification Rank	Rate of Wear Vibe	Field Wear Taber 4 Touches	Field Wear 2 hour to 1 year Vibe (white) per microinch
Rhodium	1050 Cycles per microinch	Rhodium	3.5 hours per microinch	265 Days per microinch	1.75 years
Platinum	1000 Cycles	Platinum	3.0 hours	250 Days	1.5 years
Ruthenium	425 Cycles	Silver	1.43 hours	212 Days	Less than a year
Palladium	216 Cycles	Ruthenium	1.3 hours	108 Days	Less than 1 year
Gold	210 Cycles	Palladium	.8 hours	105 Days	Less than 6 months
Silver	135 Cycles	Gold	.4 hours	67 Days	Less than 6 months

Given the test data and the several factors the neither test can incorporate such as oils and perspiration from the skin, household chemicals, perfumes and other accelerators of wear; the testing supports the general direction of:

1. Gold electroplate at 7 microiches has a field wear expectation of over 1 year in the field as opposed to flash gold at less than 6 months or quicker given some of the accelerators discussed above.
2. White precious metals illustrated very good wear even at the lower specifications. The problem is not the wear factor but the processes ability to control to the lower thickness without ultimately putting on too little. Therefore, the benchmarks suggested for platinum, rhodium, ruthenium and palladium are set to insure proper

process control limitations to insure good specifications are achieved which will drive good field wear data.

Silver is soft, it wears relatively fast (as the wear study supports) it oxidizes which increases the wear factor and is more negatively affected by the accelerators discussed above. Therefore, the specification of 100 microinches is supported by this data and recommended.

TABER® INDUSTRIES

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May 24, 2013

Suzan Flamm
Jeweler's Vigilance Committee
23 West 45th St.
New York, NY 11050

Subject: TABER Test Request (C2236)

Dear Suzan:
Thank you for your interest in Taber Industries. I have completed my evaluation of the precious metal clad samples that you submitted. The purpose of the testing was to determine if I am able to differentiate in the wearability/abrasion resistance between two precious metal clad samples. I am to perform a direct comparison between thinner and thicker clad samples. I utilized the Taber Model 5750 Linear Abraser.

Instrument set-up is detailed below:

Instrument:	Taber Linear Abraser – Model 5750 with T-slot Table and standard T-slot clamps
Abradant:	CS-8 ¼" diameter Wearaser
Load:	500 grams
Speed:	60 cycles per minute
Stroke Length:	1 inch
Temperature:	71°F
Rel. Humidity:	48%
Operator:	Cliff Fee
Date of Test:	May 16-24, 2013

Test Method:

- The Samples were received as 2 inch x 2 inch square specimens with particulars as shown on the last page of this report.
- **Sample 1A, Location A** was set-up with a ¼" diameter CS-8 Wearaser, 350 gram load (consisting of base load, collet, spline and weight holder), a speed of 60 cycles per minute (cpm) and stroke length of one inch.
- The Sample was clamped to the specimen table using standard clamps for the unit.
- An initial weight was recorded.
- The test was started and monitored the entire time.
- At 100 cycles the test was stopped, a weight loss was recorded and the Wearaser was inspected for loading of debris. There was some minor debris. I decided that the Wearasers would be refaced prior to and at every 500 cycle increment for all specimens.
- The weight loss was very minute and I opted to use a heavier load.
- **Location B** was tested the same as Location A with the exception that the load was increased to 500 grams by adding an additional 150 gram auxiliary weight.
- After 500 cycles the test was stopped and the Wearaser was refaced. Refacing was accomplished prior to each test as well as at every 500 cycle interval using the Sharpener/Depth Gage.
- The test was stopped and a final weight was recorded. There was immeasurable weight loss.
- **Location C** was tested with CS-8 Wearaser, 500 gram load, speed of 60 cpm and stroke length of one inch.

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- The test was stopped at 500 cycles and the Wearaser was refaced.
- The test was restarted and stopped at 580 cycles as the nickel strike was becoming apparent. A weight loss was taken and again it was immeasurable.
- I note that weight loss is not a good indicator for this test so I will only report cycle counts.
- I test was restarted and stopped at 1,000 cycles for refacing.
- The test was restarted and continued until 1,200 cycles. Again the nickel strike is apparent.
- **Location D** was tested the same as Location C above with no weight loss data recorded.
- The test was stopped at 1,500 cycles as a full wear path of nickel strike was apparent.
- **Sample 2A, Location A** was set-up with a ¼" diameter CS-8 Wearaser, 500 gram load (consisting of base load, collet, spline and weight holder), a speed of 60 cycles per minute (cpm) and stroke length of one inch.
- Testing was started and stopped at 500 cycles.
- **Location B** went to 1,000 cyles.
- **Location C** went to 1,500 cycles.
- **Location D** went to 2,000 cycles.

I note that Sample 1A at 1,200 cycles shows similar damage as Sample 2A at 500 cycles. This indicates that Sample 1A is more abrasion resistant as compared to Sample 2A.

- **Sample 3A, Location A** was set-up with a ¼" diameter CS-8 Wearaser, 500 gram load, a speed of 60 cpm and stroke length of one inch.
- The test was started and monitored the entire time.
- At 500 cycles the test was stopped and the Wearaser was refaced.
- **Location B** was tested the same as Location A with the exception that the cycle count was increased to 1,000 cycles with refacing every 500 cycles.
- **Location C** was tested the same as Location A with the exception that the cycle count was increased to 1,500 cycles with refacing every 500 cycles.
- **Location D** was tested the same as Location A with the exception that the cycle count was increased to 2,000 cycles with refacing every 500 cycles.
- **Location E** was tested the same as Location A with the exception that the cycle count was increased to 4,000 cycles with refacing every 500 cycles.
- **Sample 4C, Location A** was set-up with a ¼" diameter CS-8 Wearaser, 500 gram load, a speed of 60 cpm and stroke length of one inch.
- Testing was started and stopped at 1,000 cycles.
- **Location B** went to 2,000 cyles.
- **Location C** went to 2,500 cycles.
- **Location D** went to 4,000 cycles.

I note that Sample 3 at 4,000 cycles shows similar damage as Sample 4C at 2,500 cycles. This indicates that Sample 3 is more abrasion resistant as compared to Sample 4C.

- **Sample 5A, Location A** was set-up with a ¼" diameter CS-8 Wearaser, 500 gram load, a speed of 60 cpm and stroke length of one inch.
- The test was started and monitored the entire time.
- At 500 cycles the test was stopped and the Wearaser was refaced.
- **Location B** was tested the same as Location A with the exception that the cycle count was increased to 1,000 cycles with refacing every 500 cycles.

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- **Location C** was tested the same as Location A with the exception that the cycle count was increased to 1,500 cycles with refacing every 500 cycles.
- **Location D** was tested the same as Location A with the exception that the cycle count was increased to 2,000 cycles with refacing every 500 cycles.
- **Location E** was tested the same as Location A with the exception that the cycle count was increased to 6,000 cycles with refacing every 500 cycles.
- **Location F** was tested the same as Location A with the exception that the cycle count was increased to12,000 cycles with refacing every 500 cycles.
- **Sample 6A, Location A** was set-up with a ¼" diameter CS-8 Wearaser, 500 gram load, a speed of 60 cpm and stroke length of one inch.
- Testing was started and stopped at 1,000 cycles.
- **Location B** went to 2,000 cyles.
- **Location C** went to 3,000 cycles.
- **Location D** went to 4,000 cycles.
- **Location E** went to 6,000 cycles**.**

I note that Sample 5A at 12,000 cycles shows similar damage as Sample 6A at 6,000 cycles. This indicates that Sample 5A is more abrasion resistant as compared to Sample 6A.

After discussion with the customer, I started testing the thinner clad sample and then the thicker clad sample. I was also told that I am to directly compare the two samples of the same cladding but with different thicknesses.
I will still show the samples in numerical order even though I tested more cycles on the thinner clad sample.

- **Sample 7B, Location A** was set-up with a ¼" diameter CS-8 Wearaser, 500 gram load, a speed of 60 cpm and stroke length of one inch.
- The test was started and monitored the entire time.
- At 200 cycles the test was stopped
- **Location B** was tested the same as Location A with the exception that the cycle count was increased to 1,500 cycles with refacing every 500 cycles.
- **Sample 8, Location A** was set-up with a ¼" diameter CS-17 Wearaser, 1,000 gram load, a speed of 60 cpm and stroke length of one inch.
- Testing was started and stopped at 33 cycles. Too aggressive and not enough cycles/
- **Location B** was tested the same as Location A with the exception that the load was decreased to 500 grams.
- Test was stopped at 65 cycles. Too aggressive.
- **Location C** was set-up with a ¼" diameter CS-10 Wearaser, 500 gram load, a speed of 60 cpm and stroke length of one inch.
- At 65 cycles the test was stopped. Too aggressive.
- **Location D** was set-up with a ¼" diameter CS-8 Wearaser, 500 gram load, a speed of 60 cpm and stroke length of one inch.
- At 200 cycles the test was stopped .

I note that Sample7B at 1,500 cycles shows similar damage as Sample 8 at 200 cycles. This indicates that Sample 7B is more abrasion resistant as compared to Sample 8.

- **Sample 9, Location A** was set-up with a ¼" diameter CS-8 Wearaser, 500 gram load, a speed of 60 cpm and stroke length of one inch.
- The test was started and monitored the entire time.
- At 500 cycles the test was stopped
- **Location B** was tested the same as Location A with the exception that the cycle count was increased to 1,500 cycles with refacing every 500 cycles.
- **Location C** was tested the same as Location A with the exception that the cycle count was increased to 3,000 cycles with refacing every 500 cycles.
- **Sample10, Location A** was set-up with a ¼" diameter CS-8Wearaser, 500 gram load, a speed of 60 cpm and stroke length of one inch.
- Testing was started and stopped at 500 cycles.
- **Location B** was tested and was stopped at 1,500 cycles.

I note that Sample 9at 3,000 cycles shows similar damage as Sample 10 at 1,500 cycles. This indicates that Sample 9 is more abrasion resistant as compared to Sample 10.

- **Sample 11, Location A** was set-up with a ¼" diameter CS-8 Wearaser, 500 gram load, a speed of 60 cpm and stroke length of one inch.
- The test was started and monitored the entire time.
- At 500 cycles the test was stopped
- **Location B** was tested the same as Location A with the exception that the cycle count was increased to 1,500 cycles with refacing every 500 cycles.
- **Location C** was tested the same as Location A with the exception that the cycle count was increased to 3,000 cycles with refacing every 500 cycles.
- **Sample12, Location A** was set-up with a ¼" diameter CS-8Wearaser, 500 gram load, a speed of 60 cpm and stroke length of one inch.
- Testing was started and stopped at 100 cycles.
- **Location B** was tested and was stopped at 500 cycles.
- **Location C** was tested and stopped at 1,500 cycles.

I note that Sample 11 at 3,000 cycles shows similar damage as Sample 12 at 1,500 cycles. This indicates that Sample 11 is more abrasion resistant as compared to Sample 12.

Conclusion: I would recommend that more specimens from different lots, batches, etc. be tested to provide additional data on the products that were tested.

Tested samples will be returned for your review.

Questions or comments regarding test methods or test data may be directed to me.

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TANURY INDUSTRIES
PERFORMANCE COATINGS

Testing Matrix for JVC May 6, 2013

Process	FTC Specification 1	#	Specification 2	#	Taber Wear Stop @	Process Undercoat	Cycles to Failure
Gold Electroplate	7 microinches	**1** **9.0**	2 microinches	**2** **1.5**	Nickel	Nickel	1-1200 2-500
Platinum Electroplate	5 microinches	**3** **8.0**	2 microinches	**4** **2.0**	Copper	Copper	3-4000 4-2400
Silver Electroplate	100 microinches	**5** **105**	40 microinches	**6** **45**	Copper	Copper	5-12,000 6-6,000
Palladium Electroplate	5 microinches	**7** **5.0**	2 microinches	**8** **1.5**	Copper	Copper	7-1500 8-200
Rhodium Electroplate	3 microinches	**9** **5.0**	1 microinches	**10** **1.0**	Copper	Copper	9-3000 10-1500
Ruthenium Electroplate	5 microinches	**11** **5.0**	2 microinches	**12** **2.0**	Copper	Copper	11-3000 12-1500

Cliff, the added columns with the number sign (#) is intended to label the **coupon #** (marked on back) and below the # sign is the **x-ray thickness.**

Process films are not very thick…all coupons will be marked and will have x-ray data. Taber must be made aware that their test set up should be sensitive to very low film thickness…..meaning the weight and abrasives used should be light and mild so that the maximum number of cycles can be counted prior to cut through.